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CONTENTS

EDITORIAL:
Editorial Notes 365
The Railway Labor Situation III..... 367
Indiana Commission Investigation of Rails..... 368
Solid Steel Wheels..... 369
New Books 369
LETTERS TO THE EDITOR..... 370
ILLUSTRATED:
Steel Wheels; by Chas. G. Bacon, Jr..... 371
Experimental Mallet Locomotive for the Pennsylvania..... 377
Construction of the Milwaukee, Sparta & Northwestern..... 382
MISCELLANEOUS:
The Question of the Improvement of Rail Design and Specifications; by W. C. Cushing 374
The Danger of Shortage of Railway Facilities..... 378
Train Accidents in January 387
Intermittent Acetylene Lights on Signals..... 389
Northern Pacific Train Rules..... 390
Foreign Railway Notes.....370, 381, 389
GENERAL NEWS SECTION..... 392

AN important point in regard to the wear of solid steel wheels was made in the discussion on the proposed specification for steel wheels by the American Society for Testing Materials at its last convention. The limits for chemical composition are rather wide, allowing carbon .60 to .85 per cent.; manganese .50 to .80 per cent., and phosphorus and sulphur as high as .06 per cent. It was explained that these limits were made to admit either basic or acid open hearth steel, but there are objections to such a wide variation in the elements which affect the hardness and wear of wheels. Steel wheel records must take account of the two wheels on one axle, as it is desirable to have wheel mates as near the same hardness as possible, since the service of the softer wheel will determine the time when the pair must be removed for turning. If a .60 per cent. carbon wheel is mated with one containing .80 or .85 per cent., after about 10,000 miles service the soft wheel will show wear in the throat. This production of a sharp flange on the softer wheel will cause the harder wheel to crowd it to the rail, and in time the flange on the soft wheel will reach the prescribed limit for wear and require the removal of the pair for re-turning before the hard wheel has shown much wear. Some of the larger roads require the carbon content to be stamped on the wheel, and the two wheels on one axle are so mated that the carbon does not differ more than .05 per cent.; but it is probable that the carbon in different parts of the same wheel varies more than that amount. While it may be possible for manufacturers to furnish fairly accurate records of carbon for individual passenger and engine truck wheels, it is not to be expected that this will be forthcoming for freight car wheels, which will be ordered in as large lots as from 5,000 to 10,000. On account of the importance of mating wheels which are similar in hardness, and the wide range allowed by the proposed specification, the subject was referred back to the committee for a revised report next year.

THE Long Island Railroad's order requiring conductors, trainmen and station agents to make every effort to ascertain the cause of any sudden interruption of train service, and answer questions freely and courteously, is quoted elsewhere in this issue. This is highly commendable, especially the clause addressed to station agents. To advise prospective passengers "properly" means, among other things, to advise them promptly. And the agent is not to wait to be asked. This circular should be made permanent in some way, perhaps as a part of the rule book, for it is a good thing to have these instructions in black and white, even though the agents and conductors may already be doing pretty well. Long Island passengers should specially appreciate this courtesy, as they make many thousands of trips which, though short, are important; but the rule is well worth imitation on all railways, whether the suburban business is heavy or not. It is well for all grades of employees to be reminded of the duty not only to be ready to meet passengers' expressed wants, but to anticipate their wants. Much has been said about courtesy. Thoughtfulness and politeness go together. No railway officer makes persistent efforts to inculcate politeness and courtesy, but that he finds a need for stimulating intelligence also. Courtesy to a passenger implies, if it does not include, telling him what he wants to know; or at least what he needs to know to enable him to make his journey with all reasonable expedition and convenience. Politeness and ignorance make an exasperating combination. If, now, the Long Island plan, with its enlightened treatment of passengers, could be combined with the Frisco plan for improving relations with freight patrons, we should have an "uplift" of station agents that would surely be notable. It is to be hoped that both roads will have many imitators; these new plans being so promising that the experiments ought to be greatly extended. Many small stations are manned by agents far less competent than ought to be provided, while at many larger ones the agent's enthusiasm may have been pretty well killed out. In this situation any move to make the agents more efficient is to be commended, for if the men have not the capacity to improve themselves, the plan logically will compel the employment of better men.

THE construction of the Milwaukee, Sparta & Northwestern, described elsewhere in this issue, is an illustration of a type of railway building which, although not uncommon in the East, is still essentially new on Central and Western lines. It was built by the Chicago & North Western primarily as a long low grade cut-off to provide added facilities and improved operating conditions for handling an already very heavy traffic. Although not a feeder for the system of which it is a part, its opening should result in a material increase in traffic since it

forms a part of a through low grade route from Chicago to the Northwest by way of Milwaukee, which allows the North Western to compete much more actively for the heavy tonnage originating in the industrial and manufacturing territory adjacent to Milwaukee. The most interesting feature of the construction to engineers is the bridge work. The tendency to avoid highly reinforced concrete piers and abutments is in keeping with the policies of several other prominent roads. The Cushing cylinder pier bridges which were used in two cases have been developed in this country principally by the engineering department of the North Western, and used on some of the most important structures that this road has built. This type of pier is by no means new, as it has been widely applied in England and on the continent of Europe, and, to a limited extent, on other roads in this country. The usual practice among English engineers is to use cast iron cylinders, but owing to the unreliability of this metal for constructive purposes it has never been adopted in the North Western's work. The economy of this design for the two locations where it is used on the new road seems unquestionable as compared with cofferdam or caisson work. Although it has been the policy of the North Western to build temporary structures on new lines and replace them later in permanent form as the earnings of the line warranted the expenditure, the traffic to be handled on this line immediately upon its completion made it advisable to build it to a standard equal to the best of the company's old lines. The single track section is provided with double track substructures in all permanent bridges, indicating that the traffic is expected to grow to an extent requiring double track throughout in the not very distant future. The fast through passenger and freight service inaugurated immediately after the opening of the line is an indication of the traffic now handled.

ONLY once since 1907 has the report of the American Railway Association shown such a large car shortage as is shown for the two weeks ended February 14. The total car shortage for this period was 36,928, of which 24,094 were box cars. In the two weeks ended November 10, 1909, there was a shortage of 39,902 cars, but of these only about half were box cars, and the increase over the previous two weeks was almost entirely accounted for by a very large increase in the demand for coal cars. It is probable that weather conditions are in good part the cause of the showing made in the first half of February, 1912, the demand for coal cars being abnormal and the supply of box cars being below normal because of delayed movement. The chart published in our news columns showing car surpluses and shortages in 1907 to 1912, inclusive, shows a curve for the present calendar year unlike any year since 1907. In 1908, 1909 and 1911 the car shortage remained at a minimum figure from the first of the year till at least August. In 1910 there was a slight bulge in January culminating in the middle of February, but it was by no means as sharp as that shown this year, nor did box car shortage play any noticeable part in it. Weather conditions in that year in the Northwest were especially severe. In that year also, however, there was general activity in business throughout the country, and the *calendar* year was a generally prosperous one for the railways, in volume of traffic handled. While trade has not been active since 1910, neither have railways been buying or building a normal supply of cars. Trade reports at the present time indicate a slow but apparently healthy increase in orders for dry goods and other commodities; it is generally acknowledged that retail dealers have very small stocks on hand. It may well be, therefore, that, instead of showing a sharp reduction in shortage, as in 1907 after the middle of February, and a very large increase in surplus cars after the first of April, as in 1910, the shortage may continue to grow well into March, with a continued comparatively small surplus thereafter. In an item printed in our traffic news columns the Grand Trunk Pacific says that it is moving all the grain which the farmers are offering to it. The report of the American Railway Association shows, however, that the total shortage on all Canadian lines increased from 4,366 at the end of January to 8,146 in the first two weeks in February.

THE general efficiency of the postal service is often used as an argument for government ownership and operation of railways and other public utilities. It was largely on this argument that the postmaster-general recently founded his recommendation that the telegraph service be nationalized and operated by the postoffice. Some interesting side-lights are thrown on this subject by the flood of complaints of extraordinary delays in the delivery of newspapers and other second-class mail which it is reported has been raining on the postoffice department and members of Congress for several weeks. Second-class mail is said to have been commonly delayed from 6 to 72 hours, and in many cases equal tardiness has been noted in the delivery of first-class and even special delivery mail. The matter has been brought forcibly to our attention by subscribers of the *Railway Age Gazette,* who have not been receiving their copies of the paper regularly. Without casting unjust aspersions on the postoffice department for delays due to weather and transportation conditions, which our readers are in a position to appreciate—but which do not explain why some people receive mail 48 hours later than others from the same train—the fact that the postoffice department has for some time been undergoing a spasm of economy immediately suggests itself, together with the question as to how such methods of economizing would appeal to the patrons of a government-operated railway system. The postoffice department, like the railways, has been criticised as wasteful, and, like the railways, it has been charged with discrimination in rates on the ground that the first-class rate of postage has borne a large part of the cost of handling second-class matter. The department was prevented by the united opposition of the periodical publishers from advancing the second-class rate, which was alleged to be unreasonably low, just as the railways have generally been prevented from removing discriminations by advancing the lower instead of reducing the higher rates. The postoffice department has sought to reduce the expense of handling second-class mail by sending monthly periodicals by freight instead of on passenger trains, and it has recently been brought to our attention that the entire issue of a monthly periodical was held at the Chicago postoffice for three days to complete a carload. In another instance periodical mail was held at Kansas City for a week while the department was endeavoring to get a full carload before moving it to the Pacific coast contract zone for distribution. Railways have been criticised when in their efforts toward economy and efficiency they have held freight trains in order to approximate the rated tonnage of their locomotives. They could save a great deal of money if they could hold their passenger trains for a full load, or even if they could curtail the number of unprofitable trains. The postoffice department encountered the same obstacle in its effort to readjust its rates as do the railways. Could a governmental service that will delay mail a week in the interest of economy give satisfaction by applying the same methods to freight or passenger trains?

SOME pertinent suggestions regarding uniform classification of freight are made in another column in a letter from a shipper who believes that the recent proceedings before the Interstate Commerce Commission which led to the suspension of Western Classification No. 51 have shown that instead of there being a demand on the part of the public for a unification of classifications, a very strong hostility to the plan exists. The railways have always contended that complete unification probably is impracticable, if not undesirable, and have been induced to make a beginning of the work by constant pressure on the part of the Interstate Commerce Commission, the National Association of Railway Commissioners and some shippers' organizations. They have realized from the first that the adoption of complete uniformity of classification provisions, or even a sincere effort to remove some of the differences which frequently cause trouble to shippers handling business in more than one classification territory, must necessarily have an important influence on commercial conditions and in many cases must affect some shippers adversely.

In any attempt to equalize classification requirements in the three territories whose local conditions have caused differences in classification the railways must seek to protect their own interests by offsetting changes that will reduce their revenues by changes that will increase them. Although the state commissioners who have been most active in inducing a suspension of the Western classification have made much of the "millions of rates" that would be affected, thus far it appears their more specific protests have been directed mainly against changes proposed by the railway to correct actual discriminations rather than to affect revenue. In an editorial published on September 8, 1911, the *Railway Age Gazette* said that "if shippers do not want such disturbance of business conditions as will inevitably result their proper course is to oppose a uniform classification at all, rather than to wait until the railways have gone to the trouble and expense of framing it, and then denounce them for proposing such changes as they must propose if they are to propose a true uniform classification." In the course of the hearings before the Interstate Commerce Commission during its investigation of the Western classification the shippers will be given ample opportunity to make known whether they desire the railways to continue their work toward unification, and if so, whether they are willing to accept the necessary consequences. Many believe that the commission may find that it has made an erroneous estimate of the shippers' wishes in this respect.

THE RAILWAY LABOR SITUATION. III.

WHEN Mr. Brandeis attacked the efficiency of American railway operation, and advocated the adoption of "scientific management," it was not railway managers who in reply attacked scientific management. They denied that railway operation was as inefficient as he implied, or that as large savings as he asserted could be made by the methods he suggested. But they conceded that there were methods of employing, training and compensating labor, which would increase efficiency and which, therefore, were desirable.

The most vigorous and direct attacks on efficiency methods came from spokesmen of the railway brotherhoods. They not only attacked scientific management as understood by Mr. Brandeis, and by Harrington Emerson and other efficiency engineers, but also other methods for increasing railway efficiency. A characteristic utterance was an article in the *Railroad Trainman*. Expressing, no doubt, the views of many leaders and of many of the rank and file of labor organizations, it attacked the large engine, the big car and the increases in train tonnage which they are used to bring about; and piecework, bonus and premium wage systems. In many cases the railways have had strikes when they have tried to introduce in their shops wage schemes under which the compensation of individual employees would vary with the amount of their work. Methods to increase train tonnage have also been not only criticised, but often actively opposed by employees.

Because of the views that have been expressed and of the difficulties railway managers have often met in adopting methods to promote efficiency, it is perhaps just to say that the brotherhoods are opposed to many, if not all, such methods. The *Railway Age Gazette* would not say this lightly; and its columns are open to any spokesman of the brotherhoods who may believe that their attitude is unfairly stated and will correctly define it.

The brotherhoods' opposition to efficiency methods have been based on several grounds. Among them are that, by "speeding up" the men, they cause over work and accidents; that they tend to increase unemployment, and that the employees do not benefit by them. Methods which cause over work or accidents may be dismissed from consideration, for any means which cannot be used without causing over work or accidents is incurably objectionable, and, indeed, cannot be called a true efficiency method. However, whether any particular method or device does cause over work or accidents is a question of fact. There are many by which the product of each worker may be increased without either over work or accidents resulting. Are the other objections to these methods, namely, that they increase unemployment and that employees do not get their fair share of the benefits of them, valid?

The argument that if the amount of work done by each is increased there will not be enough to go around, and that some will be deprived of employment, must be based on the theory that the amount to be done in the world, and therefore, the amount of wages that can be earned, are limited. But the real wages of labor are the products of labor. The more each produces, the more products there will be to divide, and, other things being equal, the more real wages each will receive. Suppose the workers of the world should carry out to its logical conclusion the theory that each should limit the amount he did, so there would be something for each to do. It is doubtful if, under any practicable organization of industry, the supply of every product could be so nicely adjusted to the demand that all producers would have employment. The fact that some are now out of employment is not because others are working too much, but because there is a mal-adjustment of the supply of and demand for the products of labor, in consequence of which, while the demand for some products is such that more of them than are being produced could be disposed of, the supply of others is so large relatively to the demand that there is no work at all for part of those who are adapted and used to supplying them. If on account of the unemployment of some those who are now employed reduced the amount of work that they do, this would not correct the mal-adjustment between demand and supply which has been referred to. It would merely reduce the total amount of production.

Suppose that by successive stages working men reduced the amount that they did until almost nothing was produced. When the process was completed there would still be unemployed men unless the mal-adjustment between supply and demand had been completely remedied, and society would be without food and clothes because of the cessation of production. If the process were reversed and production were increased those who were out of employment would not be hurt, while all the rest would be helped. Indeed, those who were out of work might be helped because if they could not get employment they would at least stand a better chance of being the beneficiaries of a generous charity. It is obvious that the increase of production could be carried to the limit of healthy human activity and to the confines of ingenuity and skill in inventing and developing labor-saving machinery and devices to the benefit of all.

The introduction of labor-saving methods and devices often does temporarily throw out of employment workers directly affected by them. But to refrain from introducing improvements on this account would be to put the temporary interests of the relatively very few who would thus be unfavorably affected above the permanent interests of the many who would be directly or indirectly benefited. It is also true that a marked increase in the supply of a particular commodity or service may result in throwing some of its producers out of employment. But industrial history shows this condition is only temporary. Increased efficiency in production is usually accompanied by decreased cost of production and by an increase in the demand for the product, which means an increase in the demand for the labor of those who produce it. It is significant that in spite of all the labor-saving devices and methods that have been introduced in the railway business in recent years, the number of railway employees in the fiscal year 1910 was 1,699,420, which is 27,346 more than in any previous year.

It is a just conclusion, therefore, that ordinarily improvements in devices or methods which increase the efficiency of labor do not tend to increase unemployment, and that if the increased product or income be equitably divided the increased production is of benefit to all. But, it is contended, labor will not get a share, or its fair share, of the results of increased production. Why not? Are there any greater difficulties in the way of getting a fair division of a large product than of a small one? The

answer must be in the negative. Certainly it cannot be said that employees of railways have not benefited by the economies made in recent years in railway operation, for their wages have been raised repeatedly. If these economies had not been introduced, often over the opposition of the labor unions, it would have been impossible for the railways to have granted the increases in wages that they have without making extensive increases in passenger and freight rates. Recent experience shows this is not easy to do.

The conclusion cannot be escaped that increases in the efficiency of machinery, methods or men cannot injure employees themselves and are almost certain, in the long run, to benefit them. How, then, are the desired increases in efficiency to be secured? The Chicago & North Western and its employees are trying to put the idea of co-operation into practical use by the organization and work of efficiency committees. The plan and its operation have been described in the *Railway Age Gazette.* It is an interesting and vitally important question as to how far such co-operation can be carried. Probably the best means for getting the maximum efficiency from each employee is a wages scheme under which each worker is paid approximately in proportion to the quantity and quality of his work. Such wage schemes are the most direct and certain means of enabling employees to share in the results of increased efficiency. The labor organizations are usually opposed to piece work, premium or bonus wage systems. They favor flat scales. So far as the attitude is one of opposition to the payment of men in proportion to their deserts it is unreasonable. Sometimes, on the other hand, employers seek to introduce such wage schemes, not merely to increase efficiency, but to break down the unions. If the breaking down of unionism is a necessary means to securing reasonable efficiency such attempts are justified, but attempts by any means to break down unions merely because they are unions are unreasonable and unfair.

It does seem that a clear recognition of the fact that efficiency is just as desirable from the standpoint of the employee as from that of the employer, accompanied by a disposition on the part of each to show a decent and reasonable regard for the rights and interests of the other, might be made the basis for co-operation in working out and adopting, not only mechanism and methods, but also wage scales, that would increase efficiency to the benefit of both. In some cases differentials in wages for doing the same work under different conditions have been adopted. Oftentimes, as for running locomotives of varying power, they are based hardly at all on what the men do and almost entirely on what their machines do; and railway officers charge that such differentials sometimes have been insisted on by the employees, not in recognition of the principle that labor shall be rewarded in proportion to what it does, but for the purpose of penalizing the use of more efficient machinery. Perhaps, however, if railway managers proceeded about the matter firmly but tactfully they would be able to get the unions themselves, through their leaders, to co-operate with them in formulating schedules of wages and conditions of employment which would tend as certainly to promote efficiency as some schedules now in effect tend to promote inefficiency.

INDIANA COMMISSION INVESTIGATION OF RAILS.

THE hearing conducted by the Indiana Railroad Commission at Indianapolis on February 20 marked the entrance of a third factor in the controversy between the railways and the steel makers regarding the rail question. In view of the widespread complaint concerning the quality of rails now in track, a complaint which has increased largely within the past few months, and in view of the publicity given the report of the Interstate Commerce Commission regarding the investigation of the Lehigh Valley rail, action by regulating authorities was not altogether unexpected. The Indiana commission is the first regulating body to undertake an investigation of the general subject of rails, and its progress will be watched with great interest by both railway men and steel manufacturers.

If properly conducted the inquiry, by giving publicity to the actual facts and conditions, may be of much assistance in the solution of this difficult problem. The papers presented at the hearing by Messrs. Johnson, Dudley and Cushing are an excellent start toward a satisfactory presentation of the entire situation. Mr. Cushing's paper is given elsewhere in this issue. The attention of those interested in the rail situation is particularly called to it. Probably the territory of no other state is better located for such an inquiry than Indiana. Heavy traffic main lines of several of the larger systems cross it to reach Chicago and St. Louis from the East. A number of these main lines are double-tracked and equipped with heavy rail, automatic signals, etc., bringing them up to the standard of the best railways of the country. Other main lines traverse the state north and south between Chicago and Louisville and Cincinnati. Between these lines are many branches of all variations of density of traffic and standards of roadway and maintenance. There are about 7,500 miles of main track in the state, while the mileage of roads represented by lines within its limits is several times this amount. The climatic conditions are fairly representative of average conditions throughout the more northerly part of the United States. The newest and most modern rail mill in the country is located at Gary, Ind., while another large mill is situated close by at Chicago, giving opportunity to study mill practice at close range.

Now that the Indiana commission has definitely undertaken this work it is to be hoped that other commissions will devote their energies in this direction to assisting it, rather than to making independent investigations, for such additional inquiries would only result in duplication of work; and the amount of labor involved in a proper inquiry is so great that it is doubtful if the Indiana commission realizes the task it has undertaken. To go into this subject thoroughly—and this is the only way that satisfactory results can be secured—will require much time. The most important study of the rail question heretofore undertaken is that of the American Railway Engineering Association, and it covers the entire country, and is being conducted by a committee of 22 chief engineers, railway operating officers and rail experts, who are devoting a large part of their time to this work. In addition, this committee has found it necessary to employ an experienced metallurgist, who is giving his entire time to its investigation. In spite of all this, the Rail committee does not hope to complete its task for some time.

The attitude of the representatives of the roads, arrangements for whom were made by the Special Committee on Relations of Railway Operation to Legislation, and of the rail makers at the hearing at Indianapolis was gratifying. They expressed and manifested entire willingness to assist the commission in every way possible, in the hope that information of value will be brought out. From its disinterested position it is probable that the commission may be able to see facts bearing vitally on this question, which neither the railway men nor the steel manufacturers have noticed, because of their close proximity to the subject.

The commission assumes heavy responsibility by entering on this investigation, for while the possibilities for doing good are great, an unwise decision backed by its authority would muddy the waters, postpone a fair solution of the problem and harm the railways of the entire country. Because of the commission's jurisdiction over the roads within the state, and its entire lack of jurisdiction over the rail mills, any order it might make would necessarily be binding only on the former. For example, an order requiring the roads to buy better rails might be most unwise. The commission might be able to enforce such an order, assuming the practicability of making better rails; but it could not fix the price the roads should pay for them; and thus it might put the carriers, the party over which it has jurisdiction, at the mercy of the manufacturers, the party over which it has no jurisdiction and no influence but that of moral suasion.

Probably the commission will do the maximum of good and the minimum of harm by confining itself to getting and giving

the greatest possible publicity to the facts and using its moral influence to get the railways and rail makers to co-operate better than they have in the past in the interest of both economical and safe transportation. In other words, the commission will do the most good by the use of what A. T. Hadley has called "the power of common sense—which does not seem as strong as statutory power to prosecute people and put them in prison, but which, in the hands of a man who really possesses it, is actually very much stronger."

SOLID STEEL WHEELS.

IT is estimated that there are now in service on the railways of the United States one million solid steel wheels, or about 5 per cent. of the total wheels under freight and passenger equipment. These wheels are now used quite generally for tenders, engine trucks and passenger cars, and their use is increasing in freight service, especially for high capacity cars and for refrigerator cars which are usually found on the fast freight lines. Recent orders for freight cars from five railways alone, call for over 40,000 of these wheels, so that the number in interchange will soon be so large as to make charges for solid steel wheels a prominent item in freight car repair accounts. A stock of such wheels will also be required at repair points for replacement of worn and slid flat wheels. The standardization of the size and shape of solid steel wheels, as well as the quality of the material, are, therefore, matters of considerable interest to those in charge of the car department.

These features were considered in the paper on "Steel Wheels," by Charles G. Bacon, Jr., which we publish elsewhere in this issue. Mr. Bacon has had a large experience in the manufacture of solid steel wheels and their service, and his recommendations are valuable and timely. On account of a lack of co-operation in the standardization of such wheels, there has grown up a varying practice with respect to the diameter of the hub; the special wheels which are made with any desired hub are more expensive to make, and the charge to railways must be larger than that for wheels of standard dimensions. For engine truck wheels the diameter of the inside face of the hub, 12 5/16 in., is fairly well established as a standard, though some lines make this dimension vary from 11 in. to 14 in. An agreement among the steel wheel makers to charge an extra price for these odd sizes would help to confine the hub diameter to a standard size.

The thickness of the hub wall of 33-in. steel car wheels is another dimension which is quite variable in current practice, as an occasional loose wheel (usually due to improper boring or mounting) has suggested that a thicker hub wall would hold the wheel more securely on the axle. It has already been well demonstrated that for a 7 in. wheel fit a hub wall 1¼ in. thick is sufficient, and it is not economical to use a greater thickness, so that this dimension should also become a standard.

Perhaps the most interesting and important feature of the solid steel wheel when used in freight car service is the cost of the total mileage obtained from it. It is claimed that on account of the low first cost and the long life the expense per 1,000 miles will be less than for chilled iron wheels. The service will depend on the quality of the steel, which in forged wheels is similar to that in locomotive driving tires, and the latter require frequent turning on account of sharp flanges, flat spots and worn tread. The forged wheel will require the same treatment, and its total mileage will depend on its resistance to the wear which produces these defects and to the available thickness for repeated turning.

In the paper referred to, Mr. Bacon takes a decided stand in favor of a rim 2½ in. thick instead of 3 in. The M. C. B. limit of 1 in. thickness allows a body of steel for wear of 1½ in. in the former and of 2 in. in the thicker rim. Under present conditions of manufacture the wearing quality of the steel is obtained by the work done in forging, and it is claimed that the depth of penetration of this work is best secured in the 2½-in. rim. Beyond that the steel is softer and more liable to the defects which correspond with shelling out in the chilled iron wheel. The limitation placed on the thickness of the rim is, therefore, due to the quality of the steel found beyond the 1½ in. wearing limit, and if this steel was equally good at 2 in. depth the objection to a 3-in. rim would not be sustained and an additional mileage would be obtained from the thicker rim and the cost per 1,000 miles would be reduced. A similar condition existed 15 or 20 years ago, when light and weak tire mills were making 4-in. tires, which were found defective beyond a certain depth, while the 3-in. tires gave a more uniform and satisfactory service. Since that time heavier and stronger tire mills have been used, and the 4-in. tire is in general use for freight service, which would indicate that the degree of penetration in making a tire or a steel wheel depends on the strength of the machinery employed in manufacture.

The reasons for favoring the thinner rim are, therefore, based on limitations in the present process of manufacture, and in advancing such reasons there is a virtual admission on the part of the forged wheel maker that he cannot produce a wheel which has sound steel in the tread beyond 1½ in. thickness. It may be best to retain the 2½-in, rim for the present, but it seems inevitable that if solid steel wheels are to come into general use in freight service, economic conditions will require a greater depth of steel for the wearing body, and this demand will result in such improvements in the process of manufacture as will provide a grade of steel suitable for the service throughout a deeper rim. It is reasonable to expect this, because steel forgings of a uniform grade of steel of much greater thickness are made for other purposes, and it should not be difficult to apply the same processes to the manufacture of steel wheels.

The details of the manufacture of forged steel wheels are not described in Mr. Bacon's paper, but the low price at which they are sold—at the rate of a little over 2 cents per lb.—would not indicate that any special treatment is given beyond forming accurately to shape under sufficient pressure to secure a solid steel structure to a limited depth. The improvement in the hardness, toughness and fineness of grain, which is obtained by heat treatment and oil tempering, has apparently not been applied to the forged steel wheel, and it is probable that further experience may show that the additional expense involved in these operations will be well justified by the longer life and greater mileage which should be thereby obtained.

NEW BOOKS.

Deflections and Statistically Indeterminate Stresses. By Clarence W. Hudson, Professor of Civil Engineering, Polytechnic Institute of Brooklyn, N. Y. John Wiley & Sons, New York. Cloth, 7½ in. x 11 in. 258 pages. Illustrated. Price, $3.50.

While the importance of the study of statistically indeterminate stresses has been realized for years, few text books have been written in English on this subject until within the past year. Its treatment has been confined almost exclusively to the insertion of a short chapter in several of the standard bridge text books. In this book the author treats this subject thoroughly, with special reference to the distortions of the structures during erection. He goes especially into the methods of camber blocking and other devices used in the erection of the larger structures.

The book is well illustrated with drawings and photographs showing methods of design and erection, while a large number of tables are inserted showing the stresses, sections and weights for the different members of a number of typical designs. There are eleven chapters, which include discussions of deflections and reactions of straight and curved structures with solid webs, deflections of structures with solid or open webs, movable bridges and arches. One chapter is devoted to the distortion of structures as affecting their erection, while another discusses the adjusting devices and the adjustments required to make final connections for important structures. The volume should be a valuable one for reference in connection with class-room work in higher bridge design as well as for the use of designing engineers.

Letters to the Editor.

UNIFORM CLASSIFICATION.

Chicago, February 20, 1912.

To the Editor of the Railway Age Gazette:

The storm of controversy recently aroused over Western Classification No. 51, which was precipitated at the hearing in Chicago before Chief Examiner Brown of the Interstate Commerce Commission, and which has led to the suspension of the entire classification for 120 days, to my mind possesses some very significant features which it would seem well to consider carefully in connection with the work toward uniform classification.

In the first place, the Interstate Commerce Commission seems to have gained an impression that there is a strong demand on the part of shippers for uniform classification. It has been pressing the carriers to work out such a classification under the threat that unless they do so the commission will undertake the matter itself and force in a uniform classification. Under the spur of this continued agitation the carriers have now had a Uniform Classification Committee at work for three years and the results of their work are just beginning to come to light through the medium of the new issues of various classification committees. When the supplementary docket of the Western Classification Committee's July meeting came out the shipping public was taken completely by surprise, and not having time to go into the matter thoroughly, failed to discuss it with the committee to any great extent, contenting themselves with the request that its consideration be postponed until a later date. The carriers evidently misunderstood and under-rated the public sentiment, and adopted a large portion of the supplementary docket containing the recommendations of the uniform committee.

The answer came in the storm which broke before Examiner Brown on January 29. An analysis of that hearing seems to have demonstrated that not only is there no demand on the part of the public for a complete uniform classification, but, on the other hand, there is a tremendous hostility against the idea. It does appear that there is a demand for uniformity of descriptions of commodities and uniformity of some (but not all) of the rules and of minimum weights. The Uniform Classification Committee has done, and is still doing, a very important work in this direction, but the hearing seems to show that it has gone too far in its grouping of commodities for carload ratings. The committee should have contented itself with recommending only straight carload ratings of single articles and then left it to the individual classification committees to combine the articles that should take a single carload rating and minimum in accordance with the conditions and needs of their own territories.

Having been furnished this object lesson, is it not clear that the Interstate Commerce Commission should drop its pressure for absolute uniformity, leaving the carriers to continue the uniform committee to investigate and make recommendations to the various associations as above outlined? Instead of the Western Classification Committee abandoning its meetings, however, and by so doing working hardships not only upon the public but upon the railways, as well, should they not continue their sessions in order that the public may be afforded the opportunity to demonstrate its needs without being driven to the Interstate Commerce Commission for relief?

SHIPPER.

NATIONAL ASSOCIATION OF MANUFACTURERS AND LABOR UNIONS.

Dayton, Ohio, February 23, 1912.

To the Editor of the Railway Age Gazette:

I enclose herewith copy of a letter which I have received from the president of a large bridge construction company, whose signature I have omitted from the copy because of the fact that I have not his permission to use the letter in this, or any other, connection. The letter is self-explanatory. [The letter called attention to an editorial in the *Railway Age Gazette* of February 16, 1912, on "The Railway Labor Situation."—Editor.]

I also enclose declaration of principles of the National Association of Manufacturers; also, excerpts from an address which I delivered before the Builders' Exchange, at Baltimore, on February 8, together with pamphlet No. 2, published by the National Association of Manufacturers, containing an address of mine before the Young Men's Hebrew Society, of New York, November 7, 1909. I call your attention to the marked paragraphs on page 4 thereof.

The objectionable language employed in the editorial in the *Railway Age Gazette* referred to, to wit, "The course of the shop employees was as extreme, unwise and iniquitous as the campaign being conducted by the National Association of Manufacturers entirely to destroy unionism," being false, misleading and without warrant, I assume it to have been used under a misapprehension of the labor policy of the National Association of Manufacturers, which, as a matter of fact, is otherwise in accord with the whole spirit of your article; and your attention having now been called to the gross injustice thus committed against the National Association of Manufacturers, I assume you will make a proper reference to your error in your next issue.

The National Association of Manufacturers has never conducted a campaign to destroy unionism, nor has either of my predecessors, Mr. Parry, the late Mr. Van Cleave or myself, ever condemned unionism *per se*. On the contrary, in many public utterances, for many years, we have each declared legitimate trade unionism to be not only right, but beneficial and proper. We have, however, relentlessly opposed lawless closed shop unionism, and I will say for myself that I expect to continue doing so until my end shall come, or until the menace shall give way to a lawful and ordinary type of unionism, such as, in the article referred to, you advocate.

Many members of the National Association of Manufacturers are readers and supporters of your worthy publication, and they will expect you to correct the objectionable reference to their organization, which has diligently sought to purge unionism of its abuses, and which is rapidly accomplishing that purpose.

JOHN KIRBY, JR.,
President National Association of Manufacturers.

[Mr. Kirby's letter, the extracts from his public speeches, and the declaration of principles of the National Association of Manufacturers which he sent us indicate that the *Railway Age Gazette's* reference to that association was, as Mr. Kirby says, misleading and unjust, and that, as a matter of fact, it stands for the same principles in dealing with labor unions that this paper advocates. Therefore, the reference to it is cheerfully and completely retracted.—Editor.]

The Swiss seem to take naturally to tunnels. On the chief line from the North, passing southeast from Basel to Olten, the railway goes under one of the Jura ranges by the Hanentein tunnel, which has the respectable length of 8,187 ft. Not satisfied with that, the Swiss have let a contract to straighten 10 miles of the line, by which they will shorten the distance 369 ft., but at the cost of an entirely new tunnel no less than five miles long (26,698 ft.). Of course it is not for the sake of the saving in distance that this great work is undertaken. The old tunnel rises with a grade of 139 ft. per mile, and it has become almost impossible on account of the steep grade to get the traffic through this tunnel. The steepest grade on the new line is to be only 56 ft. per mile, and its summit will be 361 ft. lower than the summit of the existing line. The contract for carrying out the work has been let to a Berlin firm.

STEEL WHEELS.*

BY CHAS. G. BACON, JR.

The wheel committee of the Master Car Builders' Association was instructed by the executive committee, last June, to consider the designs and specifications for steel wheels and to report at the convention to be held this coming June. The wheel committee held a meeting about two months ago at which were present, by invitation, representatives of the solid steel wheel manufacturers. Upon learning that the subject of specifications covering solid steel wheels had been under consideration for upwards of two years by a special committee of the American Society for Testing Materials, the M. C. B. committee very promptly determined to accept an invitation which was extended to have representation on that committee. This latter committee is well qualified to handle this important item intelligently, being composed of representatives of the manufacturers and of the railways which have had the longest and most extensive experience with solid steel wheels. It is but right and proper that the question of design be thrown open to all, so that there may be full expression of opinion, and so that the manufacturers and the railways will reach agreements, or standards, at the earliest possible moment. The object of this paper is to place before you a list of twenty-one designs of solid steel wheels which long experience and careful study would seem to indicate are adequate standards in connection with more than ninety per cent. of the requirements of the railways of the United States today, and which would soon cover the other ten per cent. if railways would give attention to some points in connection with co-ordinate equipment; also to further place before you certain reasons why a study of the subject has convinced me that a total of eleven of these designs are all that are desirable or required.

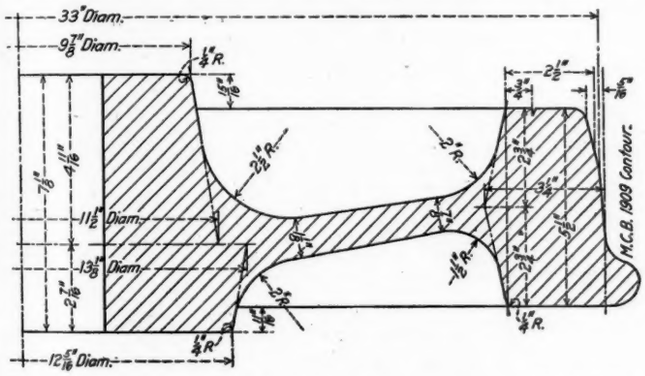


Fig. 1—Typical Design of Solid Steel Engine Truck Wheel.

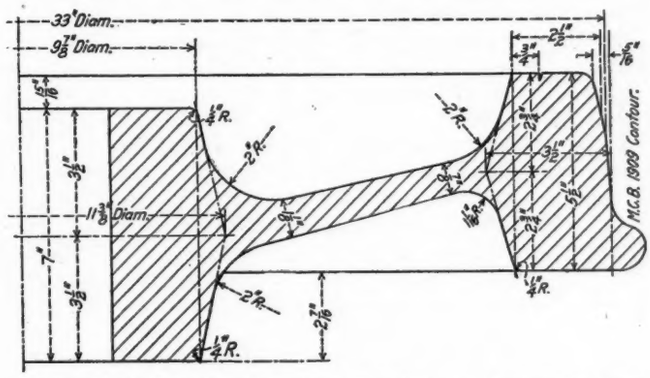


Fig. 2—Steel Wheel for Tenders, Freight and Passenger Cars.

A 33-in. steel engine truck wheel is shown in Fig. 1, which is representative of the other designs for different diameters of this type of wheel. Fig. 2 shows the design for a 33 in. tender, passenger car and freight car wheel. The salient point of difference between these two general classes is that wheels for engine trucks require inside hub faces of large diameter to provide adequate bearing surface. A total of eleven designs which I think are all that are desirable are, for engine trucks, 28½ in., 30 in., 33 in., and 36 in. For freight cars, tenders and passenger train cars, 28 in., 30 in., 33 in. (two designs) 36 in. (two designs) and 38 in.

One of the reasons for increasing the number of designs of wheels for engine trucks above the four above noted is that of the diameter of the inside face of the hub. It has long been considered by prominent roads, which have placed many thousands of solid steel wheels in engine truck service, that this dimension should properly be 12 5/16 in., but recently several large companies have called for engine truck wheels with inside hub faces of either 13 in. or 14 in.; in fact, one large system has issued a sheet setting forth that this dimension shall be either 11 in., 12 in., 13 in., 13½ in., or 14 in., under certain conditions. Ninety-five per cent. of the solid steel wheels which are in engine truck service in the United States today have 12 5/16 in. diameter of inside hub face. This dimension is standard with the roads which have had the longest and most extensive experience with solid steel wheels of this type and I am told that it has proved to be a proper and satisfactory dimension. The cost of manufacturing solid steel wheels, and therefore the price to the railways, is largely a question of the number of wheels produced per type, and this being the case it seems most important—particularly as regards engine truck wheels of which the total number required is not sufficiently large to enable manufacturers, even under the best of conditions, to reduce the cost of production to the same level as that of the other classes of which larger quantities are used—that specific attention and study should be given to this dimension of inside hub face diameter, so that a standard can be adopted for the best interests of all concerned.

For a 6 in. x 11 in. axle the hub diameter is increased from 9⅞ in. to 11 in., to provide proper hub wall thickness and this brings up a point which I wish to make one of the principal features of my paper, i. e., what is the proper hub wall thickness for solid steel wheels?

A hub diameter of 9⅞ in. has long been recognized as all that is required in mounting solid steel wheels on 4¼ in. x 8 in., or 5 in. x 9 in., or 5½ in. x 10 in. axles, i. e., up to and including 7 in. diameter wheel-seats, for even in connection with the 5½ in. x 10 in. axle, and allowing for the eccentricity provided for in the specifications, a 9⅞ in. hub diameter means a minimum hub wall thickness of 1¼ in. on a 7 in. diameter wheel-seat. During the past few months, and under the leadership of one of our large systems, which, however, is basing its statements and acts on experience with comparatively few solid steel wheels, there has been quite a move on the part of some roads, none of those which have had long and extensive experience in the matter, however, to use wheels with 11 in. hub diameter on 5½ in. x 10 in. axles, and even on 5 in. x 9 in. axles, on the ground that 1¼ in. is not sufficient for a minimum hub wall thickness and tended to "loose wheels." From a manufacturer's standpoint I have no reason to take exception to this move. A heavier wheel means a higher price, and so long as a railway wishes to pay for excess metal I do not know that it is within a manufacturer's province to object. But as one of the engineers who has had to do with the solid steel wheel subject from its infancy, and who is more or less responsible for the dimensions, I wish to assume just as definite and positive an attitude on this point as words will permit me to express.

I have long been in touch with this particular point and have had considerable personal experience in the boring and mounting of wheels, and since this question was raised recently I have made a further study of it and consulted with representatives of those roads which are qualified by long and extensive experience to speak definitely and intelligently on the subject. I find that

*Abstract of a paper read at the February 20, 1912, meeting of the Western Railway Club. Mr. Bacon is assistant to the president of the Forged Steel Wheel Company.

one large system, having over 200,000 solid steel wheels in service, has had less than a dozen loose wheels in the past six or seven years, despite the fact that 1¼ in. minimum hub wall thickness has been the adopted practice, and that in the early days of the solid steel wheel industry, when manufacture was not as accurate in some ways as at present, many wheels went into service with 1⅛ in. hub wall thickness. Of still greater interest, perhaps, is the fact that close investigation of each one of these few cases of loose wheels developed the fact that the trouble was due, solely and entirely, to improper boring and mounting and had no reference whatsoever to the wall thickness of the hub of the wheel. From another large system, with upwards of 90,000 solid steel wheels in service, I learn that in six or seven years only three or four cases of loose wheels have developed, despite the hub wall thickness of 1¼ in. minimum; investigation of these few cases showed them to be due to improper boring and mounting.

Such being the experience of those whose long and extensive use of solid steel wheels certainly qualifies them to know whereof they speak, I look upon it as a piece of undue assumption when a road with a limited experience, both in time and in quantity, sets out to be aggressive along a line with which it is unfamiliar. A hub wall thickness of 1¼ in. is all that is required with properly designed and manufactured solid steel wheels mounted on axles with wheel-seats up to and including 7 in. diameter; those who are troubled by loose wheels under such conditions must look to their own shop practices, to their boring-mills, their axle-lathes, and their wheel-presses.

Some roads in wishing for something larger than a 5½ in. x 10 in. axle have, for reasons of their own doubtless, neglected to adopt the M. C. B. standard, 6 in. x 11 in., and have gone to the use of sort of an "in-between," 6 in. x 10 in., which renders it necessary to add these two extra designs of wheels. As I am discussing wheels I do not like to encroach on another subject, but it seems to me that as much axle trouble is caused by overheating as by lack of section, and that conditions are not much improved by increasing the section without proportionate increase in bearing. In other words, is there any great advantage in a 6 in. x 10 in. axle over a 5½ in. x 10 in., the adoption of the 6 in. x 11 in. axle, instead of a mere "in-between"? I refer to this as merely another one of those features which has its effect on the cost of manufacture, and therefore the price to the railways of solid steel wheels.

Another point is brought up by the suggestion that, though shown as standard designs, I would like to eliminate the 30½ in. engine truck wheel, 33½ in. engine truck wheel, and two of the wheels used for cars, solely because they mean the use of solid steel wheels with a 3 in. rim thickness. Experience tends to prove that a 2½ in. rim thickness in connection with solid steel wheels makes for efficiency and economy, and that the use of 3 in. thickness is to be avoided. In the first place, one must consider the rim of a solid steel wheel as being of two general parts, the allowable wearing-body, being that depth which can be properly used in service, and the minimum allowable rim thickness, which necessitates removal from service. For example, in a rim thickness of 2½ in., it may be said that there is 1½ in. of allowable wearing-body, with 1 in. thickness remaining which calls for removal from service under M. C. B. Rules. It must be borne in mind that this 1½ in. of allowable wearing-body cannot be entirely used in road service. From time to time while the wheel is in service certain deformations of contour will occur, after varying mileages and with correspondingly varying depths of metal worn from tread, which necessitate removal of the wheel from service for re-machining to restore the contour.

Long experience, with general averages on numerous roads and under varying conditions, indicates that the allowable wearing-body in a rim 2½ in. thick will split-up far more economically than the wearing-body in a 3 in. rim, or, to put it in another way, as a general average proposition a road will secure more actual sixteenths of an inch of wearing-body, and fewer sixteenths of an inch of waste metal in the allowable wearing-body of a 2½ in. rim than in a 3 in. rim. And though this broad statement of fact may seem to over-shoot the mark, and to evoke remonstrance from those who have not given the point specific attention, all I ask is the opportunity for co-operative study with any railway official of conditions on his road, and I will be able to clearly demonstrate the correctness of my statement. To properly meet the conditions a solid steel wheel should possess, throughout the depth of its allowable wearing-body, an attrition-resistance equal to that of the rail, and, to obtain this, certain limits must be recognized in rim thickness from a manufacturing standpoint. Not alone must a high degree of attrition-resistance be obtained initially, but it should be maintained, as uniformly as possible, throughout the allowable wearing-body; this quality is largely secured by the work, and the depth of penetration of the work, which is put upon the rim. There is no process of manufacture of solid steel wheels known today which will produce as good and serviceable a wheel with a 3 in. rim thickness as with a 2½ in. rim thickness. Based on the records of a good many thousand wheels which have been worn out in service, the mileage-life of a solid steel wheel with 2½ in. rim thickness is greater than one with 3 in. rim thickness, all other things being equal.

I have always been, and I am today, a strong and persistent opponent of the use of the term "shelling" in connection with solid steel wheels. There has been too much of a tendency to call all defects shelling, owing to either convenience or lack of familiarity with the subject, whereas proper analysis would have classed the defect under one of three or four other and more specific headings, which would have enabled the manufacturer to handle the matter far more intelligently and in a manner decidedly more for the benefit of the railway. Shelling may be the easiest thing to think of, or to say, but it is absolutely non-specific under normal conditions in connection with solid steel wheels, and in 99 cases in a 100 means nothing at all. The chilled portion in the rim of a cast iron wheel extends at right-angles to the chill-block, and only to a certain depth, this depth being dependent on the quality of the iron, etc. The effect is a slight depth of metal with strong resistance, backed with ordinary gray iron of far less resistance, bordering, comparatively speaking, upon sponginess. When this strong surface metal had been worn so thin as to be unable to support the service-load which was on it, it would, having but a comparative sponginess or cushion beneath, mash-up and fall away in a manner which left the appearance of the outside of an oyster shell, and hence the term "shelling."

I have always opposed the use of the term "shelling" as applied to solid steel wheels, for I have believed, and my belief has been based on specific study, that no such condition should exist in properly designed and made solid steel wheels. But I must now go on record as saying that if some railway officials persist in using wheels with a 3 in. rim thickness, or over, and can succeed in inducing manufacturers to supply such types, then I must, though most regretfully, add the item of shelling to the liabilities of solid steel wheels, for close observation of many wheels of this type, not confined to any one manufacturer's product, convinces me that in a properly made solid steel wheel with a 2½ in. rim thickness there is good opportunity for knowing what you are getting, whereas with a 3 in. rim thickness you cannot be sure of anything, except that there will be a considerable percentage of dissatisfaction and trouble in the results. Let those who doubt the correctness of my position in this matter take note of the fact that the roads which have had the longest and most extensive experience with solid steel wheels have nearly all given up the use of wheels with a 3 in. rim thickness and have adopted the 2½ in. thickness as standard.

For years I have been an advocate of the idea of producing wheels so true to dimensions that the machine work was reduced to a minimum. I am still a firm believer in the theory, but only to the extent to which it can be carried in justice to the quality

of the material produced. Machine work increases the cost of production, and it may often remove metal of particular service value, yet if the effort to produce material on which machine work is unnecessary opens the door to a product which lacks uniformity, lacks many of the other virtues which it should possess, and borders on the dangerous, then extreme caution should be used in order that a "penny wise, pound foolish" policy be avoided. It may be all right to produce some of the commodities of life on the basis of tonnage, or general average, but in dealing with wheels let us not forget that we are dealing with units, each and every one of which should possess integrity; otherwise, much time will be spent in settling claims for low mileage, in providing for adjustments covering defective material, and, worse yet, in explaining how wrecks occurred. Uniformity in manufacture is perhaps the feature most to be desired in connection with solid steel wheels. But uniformity of quality should be held as paramount to uniformity of mere dimensions.

The production of proper solid steel wheels does not entail the mere forming of a bulk of steel into the shape of a wheel. It carries with it far greater requirements and responsibilities. Proper production means not alone mere shaping, but, and particularly, the working into shape along such lines as tend to preserve and develop the virtues of the material for the service in which the finished product is to be used, and the doing of this in such a way as to assure uniformity of quality as between wheels which are subsequently mated in service. Irregularity of dimensions can be easily overcome by a few pennies' worth of machine work, but lack of uniformity in quality is incurable and is sure to assume more or less serious, if not actually dangerous, forms when the wheels go into service.

Manufacturers of solid steel wheels are particularly accommodating when engaged in close competition for an order, and it is for that reason that wheels of all sorts and sizes can be obtained. But clear-headed railway officials certainly realize that the production of small quantities of an endless variety of designs means a higher cost than when a minimum number of designs permits of proportionately larger quantities, and that cost is always reflected in price. They certainly realize that in the heat of close competition a sales department will frequently offer odd designs which may or may not have been thoroughly demonstrated as unifying the possibilities of proper manufacture and the requirements of service, and they surely appreciate how standardization of wheel designs is an end to which we all should strive.

DISCUSSION.

Robert Radford (Standard Steel Works): I am not here as a competitor of the forged wheel, as all the manufacturers of rolled steel wheels feel that the latter is as much superior to the wheel which is pressed only as the pressed wheel is superior to the cast iron wheel. I am sorry that the matter of standardization should have been brought up at this time, for the Master Car Builders' Association is giving the subject attention and will report on it at the June convention. There is to be a meeting of the M. C. B. committee and the manufacturers next week, and no doubt an agreement will be reached that will be beneficial both to the consumer and the wheel maker. The Standard Steel Works is the pioneer in the manufacture of solid steel wheels in this country; the first ones made were cast and forged only, but were not entirely satisfactory; in 1904 we produced the first rolled steel wheel, withdrawing from service the forged wheels and substituting the rolled wheels, as we believed that the forged and rolled wheel was the better product. We have adopted 12½ in. as the diameter of the inside hub of engine truck wheels, and find that this gives an ample surface bearing for the box.

Regarding the thickness of the rim, I cannot agree with Mr. Bacon that in the rolled steel wheel the 3 in. rim is not as efficient and economical as the 2½ in. rim, but 3 in. should be the maximum in order that the steel may be thoroughly worked. This is the advantage of the rolling process. If the 3 in. rim is thoroughly worked and homogeneous throughout we should get ½ in. more wear from it than is obtained from the 2½ in. rim.

I admit that the expression "shelling out of steel wheels" is a misnomer, but it has been adopted as a general term, and we must accept it as showing the breaking down of the steel tire or solid wheel as well as the cast iron wheel. It is folly to say that a 2½ in. rim will not shell as much as the 3 in. rim. It has been very well demonstrated that shelling out is a condition of service, that a rim of any thickness will shell out and that the smaller the diameter of the wheel the greater the liability to shelling. The principal reason for adopting a 2½ in. rim is to avoid a multitude of dies.

If steel wheels can be rolled to diameters that will mate to the exact size, there is no necessity for machining, and if a wheel is homogeneous throughout there should be no such necessity. I have yet to find any good reason for machining wheels other than to mate them and to insure their being truly circular. There is an advantage in having few sizes and the minimum cost will result; when ordered in large quantities, and orders from several railways can be combined for a continuous rolling of one size wheel, much labor and other expense is saved which would not be possible if we were compelled to change the dies for each order.

H. C. Johnstone (Midvale Steel Company): All will agree with Mr. Bacon that adoption of standards for steel wheels is highly desirable, as there are entirely too many sizes; the changes in dimensions cost the manufacturers a great deal and they would be glad to join the railways in making a common standard. The subject of rim thickness is one in which the manufacturers of rolled wheels do not agree with Mr. Bacon. There is no reason why, in our process of manufacture, a 3 in. rim should not have homogeneous metal and be as compact, and give as much wear per 1/16 in. as a 2½ in. rim. In tires we have much greater thickness and uniform material, and I do not see why we should not have the same in rolled wheels, as the metal is all worked uniformly under the same pressure. The subject of shelled spots in steel wheels has been debated for nearly 20 years and carefully investigated by analysis of the metal, but with absolutely no final results, except that no one knows exactly what created shelled out spots. I have here an article giving a railway man's experience and stating 31 reasons which cause tires to shell out. I do not believe that there ever will be a metal produced that will not shell out, because no grade of metal thus far produced has been free from shelling. On the Canadian Pacific it is found that there is much more shelling out in winter than in summer, showing that the condition of the roadbed and the sliding of the wheels from ice and snow contribute largely to shelling out. Even tires which had been heat treated were not free from shelling, although the material was superior to anything that had been tried. With the added loads on rolled wheels there will be a still greater tendency to shell out. A majority of the railways are under the impression that the exterior metal, that is, the skin, of a tire or rolled wheel is much better than in the interior. There is a sort of a chill produced in the metal, and we have found that the mileage per 1/16 in. of wear for the first ¼ in. or ½ in. exceeds any obtained after that. I see no occasion for machining unless the process of manufacture makes it absolutely necessary, and there is nothing the matter with our metal which makes turning of the tread necessary. The only reason that we machine is to true up the contour. About 75 per cent. of our wheels are absolutely circular as they come from the tire mill, and a larger mileage is obtainel from them than from those which have been machined.

William Forsyth (*Railway Age Gazette*), in discussing the question of the 2½ in. and the 3 in. rim, agreed with other speakers that if the steel was homogeneous there was no reason why the 3 in. rim should not be used and the railways obtain from it the additional service it would render.

Mr. Bacon said, in closing the discussion: Nothing that I have said tonight must be considered in any possible way from the standpoint of an advertisement for my company. I want to say further that I was engaged longer in the manufacture

and sale of rolled steel wheels than I have been months in that of the forged steel wheel. I shall go farther and say that the observations which I have made in this paper, particularly as regards rim thickness, are based on records of rolled steel wheels. I am not advocating the use of forged steel wheels as against the use of the rolled steel wheel, or vice versa, but I want to make it understood that I am not advertising any particular method of manufacture. Of course, the 3 in. rim will be preferable to the 2½ in. if the material is homogeneous, but that is a question. I have examined wheels of different makers and have failed to see that the 3 in. rim was as homogeneous as the 2½ in. Mr. Johnstone spoke of making tires which are 3½ in. or 4 in. thick with uniform material, and I suppose that is possible. But tire manufacture cannot be compared with the making of a steel wheel, where you cannot get at the four sides for rolling. In regard to turning the tread, I have worked hard to avoid that, and within certain limitations I believe in it. I recently saw the record of several hundred wheels made by one company, used in the same service; I went over the records and found 400 wheels which had been machined and 400 which had not been turned which were comparable. The mileage of the unmachined wheels was no greater than that of the machined wheels. I found that in the process of manufacture the tread of the wheel had rolled in it all the impurities that might be on the surface, and this had caused some flaking of the metal.

THE QUESTION OF THE IMPROVEMENT OF RAIL DESIGN AND SPECIFICATIONS.*

BY W. C. CUSHING,

Chief Engineer, Maintenance of Way, Pennsylvania Lines, Southwest System.

The period between 1893, the year of the adoption of the standard rail sections of the American Society of Civil Engineers, and the first annual convention of the American Railway Engineering and Maintenance of Way Association in 1900, was occupied by the railway engineers in the study of the behavior in the track of the rails rolled, according to the new designs, which were rapidly put into service by the different railways of the country.

A preliminary meeting of the railway engineers was held in Chicago on October 21, 1898, for the purpose of organizing the American Railway Engineering and Maintenance of Way Association, and at that meeting a committee was appointed to draft the constitution and by-laws.

On March, 30, 1899, the permanent organization of the association was effected in Buffalo, by the adoption of the constitution and the election of officers.

As stated in the constitution, the object of the association was the advancement of knowledge pertaining to the scientific and economical location, construction, operation and maintenance of railways. The real and final object was, however, for the members to exchange information and experience with each other and to bring about the unification, as much as possible, of specifications for the purchase of the large amount of material and supplies used by railways, which ought to result in the mutual benefit of the manufacturers and the railway companies.

In order to hear the first reports of standing committees, the first convention was held in March, 1900, in Chicago, and among the standing committees was one on rail.

The report of the committee was largely historical, but it was developed at that and subsequent meetings that the subject was going to be one of the most important and most interesting of those to come before the association in the future.

The work of the committee of the American Society of Civil Engineers was undertaken with the object of improving the design or cross-section of rails, and did not undertake the preparation of specifications for their manufacture or inspection, but each railway issued its own specifications, which were not specifications for manufacture, but for inspection. These specifications differed from each other in various details, such as the method of testing, the allowable variations from the templates, the smoothness of the surface and the workmanship generally, while but little was said about the chemical composition. Indeed, this state of affairs must have been quite annoying and expensive to the rail manufacturers, and, as all railways were striving for exactly the same object, viz.: to obtain the best material which would make an absolutely safe steel rail, the unification of the specifications seemed to be very desirable, and if it could be brought about, the existence of the association would be entirely justified.

At the annual convention in 1901 it was ascertained that the rail sections or designs of the American Society of Civil Engineers were in use by about 70 per cent. of the railways of the country, and it soon developed in the discussion that the rail steel in use by the railways was not giving very good satisfaction. This dissatisfaction pertained to all sections of rails, and the railway engineers thought that the trouble was largely due to the temperature of rolling being entirely too high, leading to the expression of one member that "the material was squirted through the rolls." The engineers of the rail manufacturers, who were also members of the association, contended, on the other hand, that the fault was due to the rail sections, and especially to the thin base designs of the American Society of Civil Engineers. It thus developed that the railways engineers believed the trouble was entirely due to improper processes of manufacture, while the rail manufacturers' engineers placed the fault on the design of the rail cross-sections.

It was apparent, therefore, that the committee must study both the question of design and the question of rail manufacture, the latter with the special object of devising tests and methods of inspection which would more surely determine whether the material came up to the requirements of service or not. It was quite evident that this work would be of long duration, because it was necessary that more study than ever before should be placed upon both the question of rail design and its manufacture, and it would be necessary to proceed slowly and carefully, in order to avoid the misinterpretation of statistics and information. Sir Lowthian Bell is reported to have said, at the London meeting of the American Society of Civil Engineers, in 1900, that "as he had been 25 years a manufacturer of rails and 25 years a director in the North Eastern Railway, he represented both maker and user, and he had at his disposal 35,000 analyses to go upon in making deductions. From these he could prove and disprove everything that could be said for or against any composition of a rail—a facility beloved by the expert." It is well for any investigator not to forget Sir Lowthian Bell's remark. It has been brought home to the rail committee many times in its prolonged investigation.

Prior to this time, so much has been said by railway engineers about the necessity for rolling at lower temperature that, in 1900, the Kennedy-Morrison process of holding rails just before the final passes until they came to the desired temperature, after which they were put through the final passes at that temperature, was introduced by the Carnegie Steel Company, and great expectations of the value of the results were held. At the same time other rail manufacturers began rolling at lower temperature and claimed to accomplish the same results. The process did not, however, give the results expected, as the effect was only skin deep, for when the skin wore off, the ordinary metal was exposed underneath. The rails rolled after its introduction developed rather more failures than usual, and since that time the value of rolling at low temperature has been rather uncertain.

*Presented at the Indiana Railroad Commission's hearing on the rail question at Indianapolis on February 20. Mr. Cushing is president of the American Railway Engineering Association.

This experience is mentioned to show that the value of many changes in process of manufacture can only be developed after long experience, which is one of the reasons why an investigation of this kind is bound to cover a long period of time.

In 1895, at Zurich, Switzerland, the International Association for Testing Materials was organized to bring about "the development and unification of standard methods of testing, for the determination of the properties of materials of construction, and of other materials, and also the perfection of apparatus for that purpose." On June 16, 1898, or but a few months prior to the organization of the American Railway Engineering and Maintenance of Way Association, there was formed, at Philadelphia, the American section of the International Association, which, a few years later, was renamed The American Society for Testing Materials. The American section was composed of manufacturers as well as of consulting engineers, railway engineers and others, and had already begun the study of rail specifications. Therefore, at its annual convention in 1901, the rail committee of the American Railway Engineering Association submitted the rail specifications recommended by the American branch of the International Association for discussion, in order to get the subject under way.

Specifications for steel rails have always consisted of three general parts:

1. Chemical requirements or properties;
2. Physical requirements; and
3. Details of manufacture.

Up to that time the various railways emphasized one or more of these parts, according to their individual preference or experience. Some almost ignored the chemical requirements, others were more or less elaborate in their physical requirements, while some barely touched upon details of manufacture, and others treated the subject quite elaborately.

CHEMICAL REQUIREMENTS OR PROPERTIES.

The chemical properties of those proposed specifications for bessemer steel rails were those of the Carnegie Steel Company, and they are today the standard chemical specifications of all the steel rail manufacturers, and of the American Society for Testing Materials, with scarcely any alterations. They were as follows:

	50-60 lbs.	60-70 lbs.	70-80 lbs.	80-90 lbs.	90-100 lbs.
Carbon	.35 to .45	.38 to .48	.40 to .50	.43 to .53	.45 to .55
Phosphorus, not over	.10	.10	.10	.10	.10
Silicon, not over	.20	.20	.20	.20	.20
Manganese	.70-1.00	.70-1.00	.75-1.05	.80-1.10	.80-1.10

The specifications for foreign use were practically the same.

The only changes which have been made in these specifications by the steel manufacturers and by the American Society for Testing Materials up to the present time, are to make the carbon for 60 to 70-lb. rail .35 to .45, and the manganese for 90 to 100-lb. rail .84 to 1.14.

With few exceptions, the railways of the United States have accepted these chemical constituents as recommended by the rail manufacturers, because they have considered that the chemical properties were only a minor part of the specifications for rail steel, compared with the physical requirements.

To show that the railway engineers have been justified in taking this view of the matter, the following quotation is made from an article in the *Journal* of the Franklin Institute by Captain R. W. Hunt, once a manufacturer of steel rails and now a steel rail inspector of wide experience.

"Rails made by John Brown & Co., of England, and put down on American railways some years ago, have been generally held up as ideal rails, and the American makers for a long time suposed that when these rails did wear out so that they could be analyzed the secret of their good service would be told. As an illustration of how little regularity or purity of chemical composition influenced the wear, I call your attention to the analyses of thirteen of the John Brown rails, all of which had filled years of faithful service and have been selected as bright examples of what good rails should be:

	C.	Si.	Ph.	S.	Mn.	Cu.
1	0.35	0.08	0.128	0.068	0.742	0.048
2	0.39	0.071	0.156	0.155	0.662	0.32
3	0.36	0.103	0.125	0.060	0.815	Trace
4	0.70	0.306	0.111	0.008	0.681	0.016
5	0.36	0.069	0.153	0.131	0.621	0.043
6	0.44	0.208	0.098	0.059	1.046	None
7	0.45	0.102	0.128	0.105	0.616	0.056
8	0.36	0.087	0.148	0.181	0.625	None
9	0.24	0.068	0.131	0.104	0.645	0.005
10	0.37	0.051	0.096	0.050	0.639	Trace
11	0.32	0.089	0.145	0.077	0.745	Trace
12	0.35	0.069	0.077	0.099	0.945	None
13	0.28	0.032	0.084	0.053	0.312	None

"You will observe that carbon ranged from 0.24 to 0.70; silicon from 0.032 to 0.306; phosphorus from 0.077 to 0.156; sulphur from 0.050 to 0.155, and manganese from 0.312 to 1.046.

"These 13 rails, taken as a whole, were chemically a 'poor lot,' but physically, most excellent."

PHYSICAL PROPERTIES.

Two general methods for testing the physical requirements had been in use up to the year 1900, viz., a bending test of a small bar ½ in. to ¾ in. square and 10 in. to 20 in. long, and a drop test, which consisted in letting fall a weight of about 2,000 lbs. on a piece of rail with a span of 3 to 4 ft. Some railways used one method, some the other, and some both, but by 1900 the small bar test had been generally abandoned in favor of the drop test.

It was customary to make a test of every fifth heat of steel, and to let the weight fall from varying heights, according to the pleasure of the maker of the specifications. The proposed specifications of the American branch retained this method of testing the physical properties by dropping the weight of 2,000 lbs. on every fifth heat of steel, from a height of 16 ft. for rail weighing 55 to 65 lbs. per yard, 17 ft. for rail weighing 65 to 75 lbs. per yard, 18 ft. for dail weighing 75 to 85 lbs. per yard, and 19 ft. for rail weighing 85 to 100 lbs. per yard, but these conditions were not accepted by the American Railway Engineering Association, as there was a strong feeling among the railway engineers that more severe conditions of testing were necessary. They felt that the chemical properties could be left to the greater experience and chemical knowledge of the rail manufacturers, but that they must be the ones to prescribe the physical tests which the finished rails must stand in order to be accepted for such important service as carrying the railway traffic of the country. In 1904, therefore, the engineering association decided that each heat, instead of every fifth heat of steel, must be tested, and that the height of the drop should be increased.

It was also ascertained that the rail butts heretofore tested under the falling weight had been from the bottom of the ingot, and it was now made a part of the specifications that the test piece should be taken from the top of the ingot, on account of the probability that the metal would be less perfect at that end.

Testing every heat instead of every fifth heat, as formerly, was considered little short of a revolution in the method of testing at that time.

DETAILS OF MANUFACTURE.

Except in the case of a few companies, the specifications in regard to details of manufacture were not elaborate, being confined almost entirely to allowing for variations from the standard template and from the length of the rail, to smoothness and perfection of finish, to branding, etc.

In view of the agitation for colder rolling, the Pennsylvania Railroad had introduced into its specifications, in 1900, a clause requiring that the rail at the last pass should be at a red heat, preferably a dull red, but in 1901 they replaced it with the so-called "shrinkage clause," which was intended to control the temperature of the rail when being finished, by prescribing that the shrinkage, after the rail was sawed, should not exceed a certain number of inches. This clause was also introduced into the proposed specifications of the

American Railway Engineering Association, making an additional requirement in the details of manufacture.

Lately there has been a great deal of argument on the part of the rail manufacturers to have the railway engineers specify a definite percentage of discard from the ingot, in order to cut off material which is more subject to segregation and more liable to have interior defects from the shrinkage cavity, gas bubbles, etc., but the railway engineers have rigidly set their faces against such a requirement, because they feel that they are much better safeguarded by the clause introduced into the specifications of the American branch of the International Association for Testing Materials, which was that "sufficient material should be discarded from the top of the ingots to insure sound rails."

When that clause was adopted, in 1901, and for a number of years afterwards, the positions of the rail manufacturers and the railway engineers were reversed, the railway engineers believing that it was best to specify a definite amount of discard, while the rail manufacturers took the opposite view. It was well expressed by an engineer of one of the steel companies, who said: "I do not think this association, nor any other, should state definitely how much should be sheared from the bloom. The matter is entirely one-sided. If we agree here that 25 per cent. shall be sheared from the bloom, we might assume that would settle it, but it will not. The association will be perfectly safe in making the claim that sufficient shearing will be done to eliminate piping. If the manufacturers can remove the piping by shearing 15 per cent., they will not agree to shear 25 per cent. The object in shearing is to get rid of the piping, and the only matter of agreement will be to reach the point where sufficient shearing is done to remove the piping. For that reason, I think the association will make a mistake to demand that 25 per cent. be sheared off."

The railway engineers of today unanimously agree with that point of view, and their position has been further strengthened by an additional test, which will be described later. Furthermore, the records of rail failures which have been kept for a number of years disclose the incontrovertible fact that, where a 15 per cent. discard might do for one ingot, 50 per cent. would not be adequate for another.

In 1902 the American Society of Civil Engineers deemed it advisable in view of the continual criticism of the sections of rail which they had previously designed, to take up once more the study, both of real design and specifications, and accordingly a committee was appointed for the purpose. The committee of the American Society for Testing Materials also continued its study of the rail question, and joint meetings of all three committees were held so that each would derive benefit from the work of the other.

On April 25, 1906, the committee on standard rail and wheel sections was appointed by the American Railway Association, and on October 24, 1906, the committee was directed to report in addition on the subject of specifications for the manufacture of steel rails, in connection with its report on standard sections. The rail manufacturers were asked to co-operate with the committee by sending representatives to study the question with it at its meetings, and in addition the committee employed disinterested men of national reputation for their knowledge of steel making and the properties of steel, to give expert advice on the subject. After many meetings together a report was submitted on October 30, 1907, containing the recommended rail sections and specifications, both for bessemer and open hearth steel.

Further advice was obtained from disinterested persons, who had a wide knowledge of the properties of steel and its manufacture, and a final report was submitted by the committee on April 22, 1908, with the recommendation that there were many details of the development and the following up of the results in service of the new types of sections, rolled under the new specifications, which would require considerable time and much careful study, and that they could be more efficiently and more appropriately handled by the American Railway Engineering Association. The sections and specifications were, therefore, referred to the American Railway Engineering Association, with the request that it follow up the question in its various details and keep a careful record of the results, with a view to determining whether any changes should be made, either in the specifications or designs.

As the question of discard was dealt with in these reports quite fully, it is advisable to make quotations therefrom, because the earnest consideration given to the question led to the development of an additional test, which is considered of great importance in determining the quality of metal by eliminating a large number of the so-called "piped rails," or rails with interior defects:

"In the matter of discard, there was a desire on the part of the railway members to arrange for a greater discard, and a strong disposition to insist upon a uniform minimum percentage. The manufacturers, however, presented considerable evidence which tended to show that a fixed minimum percentage requirement would be not only unfair but unscientific, claiming that the extent of piping and segregation is influenced by the size of the ingot, the rate of pouring into the mould and other details of mill practice.

"With regard to the discard question, the committee has always been of the opinion that it would be preferable to test the finished product rather than specify as to details of mill manufacture.

"In pursuing its investigation of this discard question, the committee received a suggestion from William Metcalf to the effect that it would be reasonably practicable to apply the above theory to the manufacture of rails by arranging to test to destruction a number of rail butts representing a certain portion of the total output and to base rejections on the results of these tests.

"In order to avoid the unnecessary waste of good material, the committee set about to devise means by which the rejection of defective material could be insured without requiring an arbitrary and definite percentage of discard in every case, and a committee of the Pennsylvania Railroad, pursuing the same line of investigation, adopted a tentative specification which provided for a physical test of this nature, and which further provided that when physical defects were discovered all top rails of the heat should be rejected. This would result in a discard of about 25 per cent. to 30 per cent. of the entire metal in the heat whenever physical defects were discovered, and it was felt that a requirement of this nature would not only provide for the rejection of defective material, but would insure the greatest care on the part of the manufacturer.

"A trial lot of the rails of a section corresponding to type 'B' was recently rolled under these specifications as to discard, and the results convinced the committee that a development of this idea would prove the best solution of the discard problem."

In connection with the details of manufacture, an important addition was made by requiring that the brand on the rail should also contain a letter marking the position which the rail originally occupied in the ingot, so as to enable a study to be made of the effect of that position.

On June 5, 1907, a committee of civil and mechanical engineers of the Pennsylvania Railroad System and two rail manufacturers was appointed to take up the study of the rail question, and design new rail sections and recommend new specifications, with the object of improving the quality of the material used in rails manufactured for that system.

The first meeting was held on June 12, 1907, and the new rail designs, known as "P.S." sections, were adopted on September 20, 1907. Tentative specifications were recommended on November 15, 1907, and 10,000 tons of rail rolled in accordance therewith. The specifications were subsequently modified, on criticism of the manufacturers, and issued February 4, 1908.

The new rail designs of the Pennsylvania and the American Railway Association provided for a more even distribution of the metal in the head, web and base and for a thicker base, to meet the views of the rail manufacturers, who believed that a better distribution of the metal would result in an improved quality, due to more favorable rolling conditions. All of these sections are still in service and are being closely watched to determine whether the expected improvement will be realized.

The Pennsylvania Railroad System specifications have been modified several times, in the light of additional ex-

perience, and contain the improvements which have been brought about from time to time through the experiences and researches of its own committee and the committees of the other associations. So far as the chemical requirements are concerned, they are practically the same as adopted by the rail manufacturers, and the other associations. The physical requirements are determined by the drop test with the standard machine, and, in addition, the test piece is nicked and broken to reveal the presence or absence of interior defect. In the details of manufacture, the discard is required to be sufficient to secure sound rails, and the shrinkage clause to regulate the temperature of rolling is retained. The rails are marked for position in the ingot, for the purpose of subsequent identification, in order to study the effect of that position.

Similar studies and investigations are being conducted by the New York Central Lines, Harriman Lines, Baltimore & Ohio, Norfolk & Western, Lehigh Valley, Reading, and other companies, and the specifications are being improved as new knowledge is obtained. The first-named company has been foremost in the study of the effect of titanium in steel making.

Through the assignment of the rail question to the American Railway Engineering Association by the American Railway Association, the work of the committee was given an official character, and its real work commenced. The first thing of importance accomplished was the introduction of a standard drop testing machine at all the rail mills, so that the results obtained at any one mill were comparable with those obtained at any other. Up to that time, 1908, machines of different design and setting were used, and the results were unreliable. With the year 1909 began the collection of a large amount of information, obtained from research work, bearing on the disputed points of rail manufacture and on proving or testing.

In 1910 the specifications for bessemer rail, formerly adopted by the American Railway Engineering Association, were withdrawn and new ones, for both bessemer and open hearth, were presented for consideration by the association, which embodied all the improvements in the methods of determining the physical properties and the details of manufacture which had been brought forward up to that time. It was recognized, however, that numerous disputed points could only be cleared up by experimental research conducted by a trained engineer-physicist, and accordingly such an investigator was added to the committee to devote all his time to that work. The engineer of tests, M. H. Wickhorst, since his appointment, has been constantly busy with research work, and has added a great deal to our knowledge of the subject.

He has made reports on the following subjects: Influence of Carbon on Deflection; Drop, Bending and Tensile Tests on Bessemer, Titanium Bessemer, and Open-Hearth Rails; rolled by different mills, including chemical analyses and etched sections; Investigation of a Split Head Rail; Segregation, as influenced by Fire Clay on the Ingot; Strength of Rail Head; Drop Tests of Rails—Effect of Impact Energy variously distributed; Flow of Rail Heads under Wheel Loads; Segregation and Other Rail Properties as influenced by size of Ingot; Tests of Steel Rail Ingots and derivative shapes made at Watertown Arsenal; Influence of Rolling Temperature on the Properties of Bessemer Rails.

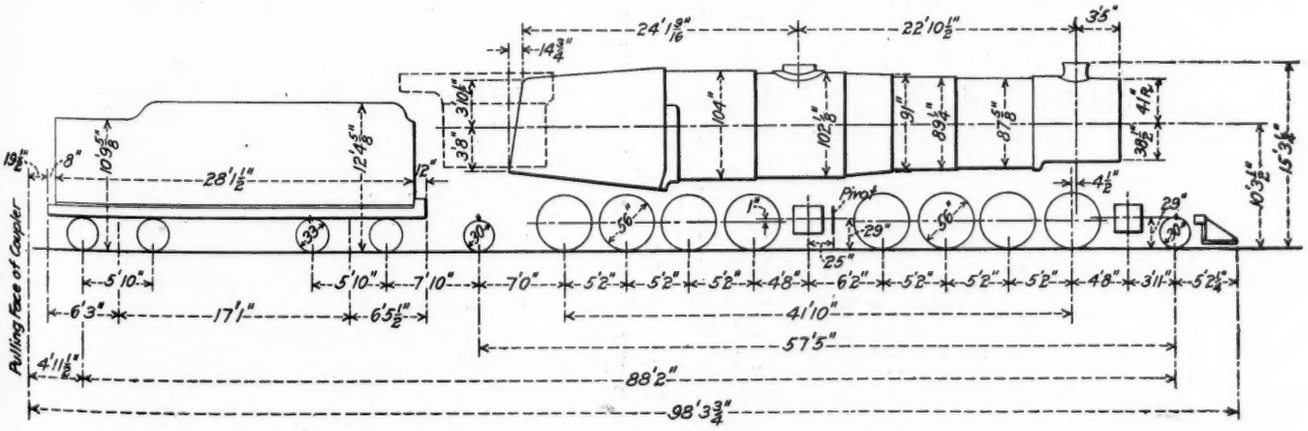
In all of this work Mr. Wickhorst has been afforded every facility by the rail manufacturers for carrying on the investigations, and their machinery, material and laboratory assistants have been placed at his disposal. In addition, their officers have been freely consulted by the committee and have attended some of its meetings.

While at the present time the American Railway Engineering Association has not adopted standard specifications for rails, yet it has had constantly before it for consideration and study a set of proposed specifications which have embodied the best knowledge of the subject, and they have been changed from time to time in the light of new experimental investigation. The most energy has been devoted to the improvement of methods of testing to determine the physical properties, and practically no changese have been made in the chemical requirements from the standard specifications of the rail manufacturers. The railway engineers prefer to subject the finished material to such tests as will cast aside the defective rails. Their specifications, therefore, include many additional tests over those in use ten years ago. The results of the work of the American Railway Engineering Association have been closely followed by the railway companies and *vice versa*, so that the specifications of the rail ways have been improved from time to time, and now embody the additional tests devised. Rails have been rolled in accordance with these new specifications for several years, and it is believed that a marked improvement is apparent in the rails being laid in the tracks since their adoption.

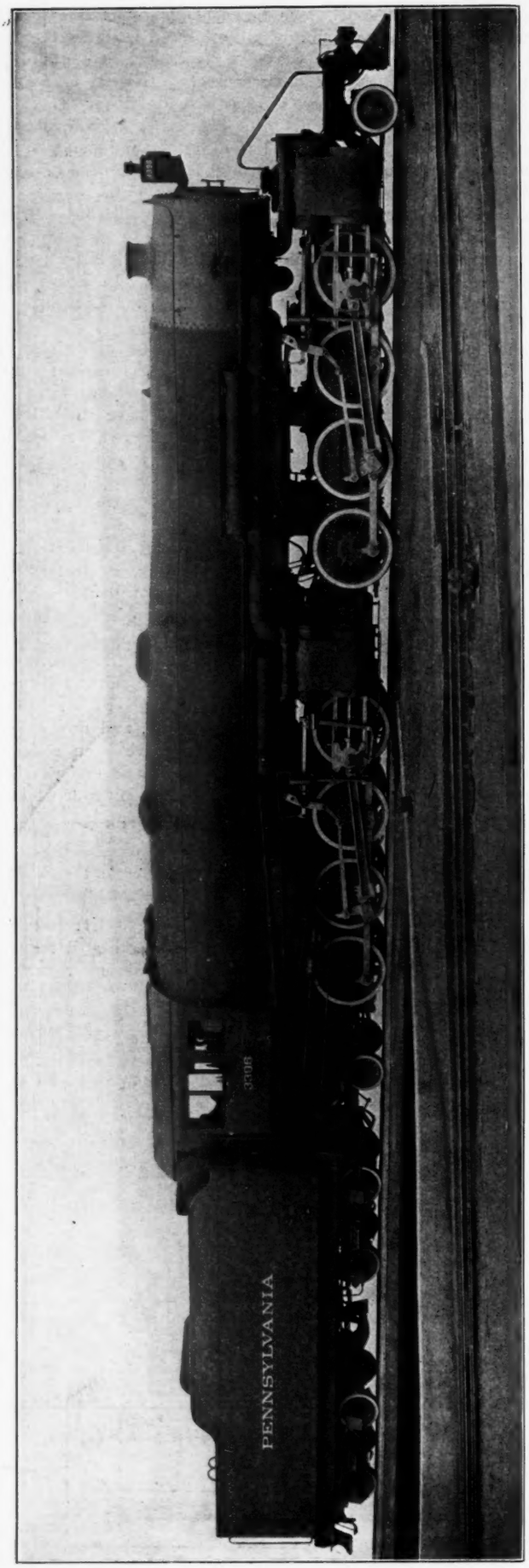
EXPERIMENTAL MALLET LOCOMOTIVE FOR THE PENNSYLVANIA.

For the first time in this country a Mallet locomotive having four simple cylinders and using high-degree superheated steam has been built. The American Locomotive Company recently completed a single example of this kind for the Pennsylvania, and it is now in experimental service out of Altoona. The locomotive has the largest boiler ever built, and is equipped with a Schmidt superheater having 1,257 sq. ft. of superheating area. There are 282—2¼ in. tubes and 45—5½ in. tubes, 24 ft. 8⅞ in. long between tube sheets, which together with the firebox give an evaporative heating surface of 6121.1 sq. ft., and an equivalent heating surface of 8006.6 sq. ft.

It was desired to use a steam pressure of 160 lbs., and com-



General Arrangement of the Simple Mallet Locomotive for the Pennsylvania.



Simple Mallet Articulated Locomotive with Superheated Steam; for the Pennsylvania.

pound cylinders of sufficient size to develop the capacity of the boiler would make the low pressure cylinders too large to pass the clearance limits. Furthermore, by the use of high-degree superheated steam it was thought that there would be no loss in economy from the absence of the compounding, and therefore four simple cylinders, 27 in. x 28 in., were applied. This arrangement, of course, necessitates the carrying of a high pressure pipe from the superheater connection in the front end back to a swivel joint near the pivot pin and then forward to the cylinders on the front engine. This has been so carefully designed and constructed, however, that it is believed that no trouble will be experienced with leakage. Because of its experimental character comparatively little information concerning the details of the design is available at this time. The engine has a total weight in working order of 482,500 lbs., of which 437,500 lbs. is on the drivers. The theoretical tractive effort figured at 85 per cent. boiler pressure is 99,200 lbs. The general dimensions are given on the accompanying diagram.

THE DANGER OF SHORTAGE OF RAILWAY FACILITIES.

The Railway Business Association has issued a bulletin forcibly calling attention to the danger of a shortage of railway facilities. "Before the shippers of the country the Railway Business Association lays the facts," says President George A. Post in an introductory note. "What is to our interest as manufacturers of railway supplies in this vital matter is to the shippers' interest. Every shipper is directly and deeply concerned in studying the danger, seeking the cause and co-operating for its removal."

The bulletin is fully abstracted in the following:

The Interstate Commerce Commission in 1908 declared: "The inadequacy of transportation facilities is little less than alarming."

What is the situation in 1912? For business men the time has already come to inquire whether the railways in the next period of constructive expansion in industry and commerce will be equipped to carry the business, or will as in 1906-7 encounter congestion, with all the disaster to industry which such a misfortune entails. The Railway Business Association has made such an inquiry. The result shows the following salient facts:

1. Locomotive, car and track capacity have increased since 1907 at a rate immensely less than what will be necessary to meet an increase in traffic approximately at the rate of growth shown in the immediate past. Current net car surplus is at so narrow a margin that a very small increase per cent. in the traffic offered would produce a net car shortage.

2. Equipment requirements to carry traffic, conservatively estimated for the five years ending 1915, will cost the railways a sum enormously in excess of their probable resources from earnings.

3. It will require the sale of new securities to an amount many hundred millions greater per annum than in the immediate past to obtain the necessary sums not available from income.

4. In order to attract purchasers and to justify incurring the obligation to pay a return on such new capital, the railways must be reasonably assured that freight rates will not be further reduced.

5. The public has now taken control of the rates. With the public the decision rests whether the rates shall or shall not be adequate to enable the railways to meet the necessities of the shippers. Failure to provide the facilities which will be needed to carry the raffic must be laid at the door of the public.

ASTONISHING GROWTH OF RAILWAY TRAFFIC.

Prudence forbids drift and delay. The problem is upon us. It may astonish many to learn that the annual tonnage is already vastly greater than the high point in 1907. The growth of freight traffic in the United States literally works while we sleep. Unseen, unheard, unnoticed, the population swells irresistibly through boom and slump alike. A calculator recently stated that since the census was taken in 1910 there had been an

increase of more than two million people. There is never a time when our enormous population falls below a certain consumption per capita. As numbers grow, so grows the aggregate demand for food, clothing, shelter and other necessities.

Long before the factories are running full time and once more enlarging plant, the tonnage carried by the railways is sweeping forward to new records. It was so after the panic of 1893. Commercial failures rising annually aggregated in the three fiscal years ending June, 1897, liabilities of $562,245,031. Yet in the fiscal year 1896, in the midst of that black period, the ton-miles passed 95 billions for the year, as against 93 billions in 1893, the previous high score. Since 1907 history has repeated itself. The ton-miles in the year ending June, 1910, were more than 255 billions, compared with 236 billions in 1907.

The persistence of growth in passenger traffic is even more remarkable. There was an increase in every year after 1907 in the number of passengers carried one mile, and the increase in 1910 over 1909, from 29,109,322,589 passengers carried one mile to 32,338,496,329, or 3,229,173,740, was greater than the increase shown in any previous year.

Do not these astounding facts suggest the desirability of inquiring into the conditions confronting us in the near future? No records of the past afford a satisfactory basis for computing the traffic of the future because of two factors:

First, the very large increase in consumption per capita, already met, in part, at least, by a large increase in productive capacity. To cite a familiar instance, the City of Gary, in 1907, did not exist; and it is believed that the increase in the productive manufacturing capacity at Pittsburgh has exceeded the total capacity created at Gary in the same period. The acreage under cultivation has also greatly expanded and modern methods must be expected to raise substantially the crop yields per acre.

Second, exports. The American invasion of foreign markets involves home production having no relation to home consumption and yet competing with other traffic for railway facilities from factory, farm and mine.

The increase in ton-miles carried from 1890 to 1900 was about 86 per cent.; from 1900 to 1910, about 80 per cent. Let us compute a growth of but 75 per cent. from 1910 to 1920. Such a growth would be made up of about 32 per cent. in the first five years, and, compounding 32 per cent. further in the second half of the decade. What increase of facilities would be required to handle a traffic increasing 32 per cent. in 1915 over 1910? Have the railways been currently augmenting their plant at a rate equal to reasonable expectation of needs? The Interstate Commerce Commission figures seem to show that they have not.

CURRENT INCREASE IN FACILITIES INADEQUATE.

It will require an increase of 18,633 locomotives to provide in 1915 a 32 per cent. increase over 1910 in total locomotive power, assuming the locomotives continue to increase in average size as in the past. The actual current increase in the number of locomotives—1907 to 1910—was at such an average annual rate that if continued it will provide only 6,307 locomotives by 1915 instead of 18,633, the estimate of requirements. It will require an increase of 586,529 freight cars to provide in 1915 a 32 per cent. increase over 1910 in total freight car capacity, assuming a continuance of the same increase in average capacity per car as in recent years. The actual current increase in number of freight cars—1907 to 1910—was at such a rate that if continued it will provide only 256,215 freight cars by 1915, instead of 586,529, the estimate of requirements.

Passengers carried one mile increased 35.4 per cent. from 1890 to 1900, and 101.6 per cent. from 1900 to 1910. Since the increase in 1910 over the year preceding, one of extreme industrial depression, was at the highest rate per cent. in the decade except one, and by far the largest absolute increase ever recorded in a given year, it would seem prudent to assume that the passenger traffic will continue to increase at as high a rate at least as it has increased, from 1900 to 1910. For the five-year period on that basis the rate would be 42 per cent.

It would require an increase of 9,839 passenger train cars of all kinds to provide in 1915 an increase of 42 per cent. over 1910 in passenger-mile capacity, assuming (1) that density of loading and substitution of larger cars for smaller ones scrapped continues to affect the performance per car in the same degree as from 1905 to 1910; (2) that passenger, sleeping, parlor, dining, baggage express, postal and other passenger-train cars are all uniformly affected by a given increase in the number of passengers carried one mile, and (3) that the proportion of Pullman-owned cars to railway-owned cars of the same class remains the same. The actual current increase in number of passenger-train cars—from 1907 to 1910—was at such a rate that if continued it will provide only 5,557 pasesnger-train cars instead of 9,839, the estimate of requirements.

The question may fairly be raised whether an apparently low rate of increase in total locomotive power and car capacity may not have been offset by an augmented rate of increase in miles of main and yard track, enabling the roads nevertheless to handle the freight adequately. But the average number of miles of track, main and yard, added per annum from 1900 to 1905 was 9,602, and from 1905 to 1910 only 8,994, while from 1907 to 1910 it was but 7,930. If the average increase per annum which was shown from 1907 to 1910—7,930 miles—should continue for the next five years, the increase from 1910 to 1915 would be 39,652 miles, as compared with 48,012 in the first five years of the previous decade—or an increase of 11 per cent. in 1910-15, as against an increase of 18 per cent. in 1900-5. Track construction, in other words, instead of increasing at a faster rate, and thus offsetting the apparently low rate of increase in total locomotive power and freight-car capacity, has shown a falling off in the rate of increase.

The situation as to equipment may be summed up by stating the facts as to current car surplus and shortage. "Car surplus" as reported by the American Railway Association in its bi-weekly statements is the working margin of cars ready to be loaded and not loaded on the day of the report.

The "surplus" is so narrow that it only required a cold snap in January, 1912, to pull the surplus down from 142,316 to 102,479 two weeks later, and to increase the shortage from 6,378 to 12,194 or a net surplus (aggregate surplus minus aggregate shortage) on January 17, 1912, of 90,285, equivalent to only 4 per cent. of freight cars owned. The average net surplus for the year 1911 was only 5.4 per cent. of cars owned. A small increase per cent. in tonnage would convert the net surplus into a net shortage.

The pressing question is: What would be the shortages—the cars which shippers are ready to load and cannot get—in the case of a general resumption of industrial and commercial extension and construction?

ENORMOUS COST OF NECESSARY FACILITIES.

How much will it cost to provide, during the next five years, the facilities estimated to be necessary? Before considering additions and betterments the railway must first keep intact and operate the facilities it has. It cost the railways in the five years 1906-1910, inclusive, 41.1 per cent. more than in the five years 1901-1905, inclusive, to maintain their property intact, to renew what was destroyed, depreciated or obsolete. This sum for the five years ending 1910 aggregated $3,503,589,300. Assuming that it will increase at no faster rate than 41.1 per cent., maintenance for the five years ending 1915 will cost $4,943,564,502.

Passing now to additions and betterments—what sums had the railways available for such purposes in the five years ending 1910 and what will be the cost of additions and betterments needed for the five years ending 1915?

In the five years ending 1910, a period when the stock paying no dividends at all never fell below 32.7 per cent. of all stock outstanding and the total dividends never exceeded 5.3 per cent. on all stock outstanding, the sums appropriated out of earnings

for additions and betterments aggregated for all the railways of the United States as follows:

1906	$49,042,631
1907	38,552,890
1908	29,174,456
1909	24,933,255
1910	57,761,865
Total, five years	$199,465,097

Next, what will the additions cost? The added locomotive power of 32 per cent. over 1910 would be equivalent to 18,633 locomotives, costing, at an average of $16,000 apiece, $298,128,000. The added freight car capacity, equivalent to 586,529 cars, at an average of $1,000 apiece, would cost $586,529,000. The 9,839 added passenger-train cars, at an average of $13,650 apiece, would cost $134,302,350. Yard track increased 22.3 per cent. 1905 to 1910, and main track 12.3 per cent. An increase of 12 per cent. in main track over 1910 would come to 31,942 miles, commonly averaged to cost $30,000 per mile, or $958,260,000; and 22 per cent. in yard track, or 18,828 miles, would cost, at $15,000 a mile, $282,420,000, giving for additions to track $1,240,680,000.

To the cost of tracks, locomotives and cars should be added a sum for enlarging terminals facilities—real estate, round houses, shops, stations, extensive terminal development like that at New York, Chicago, Washington, etc., track elevation and other similar items. This may be computed at $175,000,000 a year or $875,000,000 for five years.

Taxes increased, 1901-1911, $58,164,118, or 114.17 per cent. Compounded by five-year periods, this would be 46.3 per cent., and compounded per annum, 7.9 per cent. Estimating such an increase for the five years ending 1915, the taxes paid 1911-1915 which would not be paid if there were no increase over 1910 would be $136,745,889.

Return on new securities must also be included in the estimate of money which was not expended 1906 to 1910 and must be expended 1911 to 1915. The average rate of dividends and interest paid on net securities outstanding in the hands of the public in 1908, 1909 and 1910, the only years for which Interstate Commerce Commission figures on this subject are comparable with years succeeding, was 4.2 per cent. If the railways should issue securities in no greater amount than they did in 1910, the net increase over the year preceding of $461,227,385, and continue to pay a return no higher than 4.2 per cent. on all capital outstanding in the hands of the public, the interest and dividends which they would pay in the five years ending 1915, which they would not have paid if they had not issued such securities, will be $290,573,252. Thus we have:

Locomotives	$298,128,000
Freight cars	586,529,000
Passenger train cars	134,302,350
Track	1,240,680,000
Terminal facilities	875,000,000
Increase in taxes	136,745,889
Return on new securities	290,573,252
Total	$3,561,958,491

These figures say nothing of the return on securities necessary if capital instead of increasing annually in the same amount as 1910 increases in the amounts adequate to provide the facilities required; or of the vast expenditures made necessary by elimination of grade crossings, or statutes, both state and federal, increasing operating expenses, such as those dealing with hours of labor, size of crews, accident compensation and costly devices for promoting safety of employees and the public.

Labor cost per unit of railway service has increased instead of declining. This is in spite of increase in volume of traffic and the stupendous outlays for economical operation which have been made in recent years for reducing grades and curves, increasing size of cars and engines and hence length of trains, rebuilding of bridges and roadbed and increasing weight of rails and other track appliances to bear this added weight and the introduction of labor-saving machinery in the shops and terminals. The number of traffic units (passengers carried one mile and tons of freight carried one mile) per $1 of compensation paid to railway employees fell 17.6 per cent. from 1900 to 1910. This affords some indication of what may be expected in future.

It is estimated that three or four bills relating to safety and now vigorously urged upon Congress would involve the expenditure within the next three or four years of about $1,400,000,000.

The Hadley Railroad Securities Commission, in discussing the much higher capitalization of European roads per mile than of American, attributes this "to improvements which we have not yet made and many of which we must make in the future as population grows denser," looking to "the convenience of the public or the safety of passengers and employees."

VAST INVESTMENTS MUST BE MADE.

It is obvious that enormous sums must be raised by the issue of new securities. What sums have been raised in this way in current years? The Interstate Commerce Commission, in its report for 1908, the first year in which it seems to have stated a figure for railway securities outstanding in the hands of the public comparable with the figures for succeeding years, states that the amount in 1908 was $13,039,885,447. This increased as follows:

Year ending June 30.	Net new securities.
1909	$874,416,916
1910	461,227,385

The fiscal year ending June 30, 1910, enjoyed better general business than 1909, having shown from 1909 an increase in ton-mileage of about 16 per cent.

Yet the net amount of securities outstanding in the hands of the public showed over 1909 an increase which was $400,000,000 less than the increase in 1909 over 1908. Not only is this downward tendency significant, but the amount issued was comparatively small. If the net amount issued in 1909 were to be issued annually for the five years ending 1915 this would give total new net issues of $2,306,136,925. This sum would be subject to deductions or discounts, since few railways are able to market their securities at par. Yet the total falls more than a billion and a quarter short of the $3,561,958,491 which has been estimated in this Bulletin as necessary to be spent for the items alone of locomotives, cars, track, terminal facilities, increase in taxes and return on new securities. This is 17 times the amount spent out of income for additions and betterments in the five years ending 1910, which was $199,465,097.

Nor does it include return on more than a small part of the new securities which must be issued if facilities are to be adequate, nor the other large expenditures referred to, nor increases in the cost of labor per traffic unit.

The public has a direct responsibility for permitting such earnings as will afford the credit adequate for raising much larger sums than have been raised in the past. The position of the railway executive today is that he is told what he must spend for all these things which bring in little or no revenue, and he must also find where he can get the money with which to equip the road to carry freight. We submit that the welfare of the country requires business men as well as government officials to acquire a much more exact knowledge of railway necessities. The time has gone by for sitting back and confiding in the supernatural power of a railway manager to find the means somehow.

A QUESTION OF PRUDENT ADMINISTRATION.

The query may be put to the shipper in his capacity as the responsible head of a business enterprise: What would you do if you were in the place of the railway executive? In case you had reason to apprehend compulsory outlays of unknown amount and involuntary reduction of prices to unknown extent, would you not regard it as the part of prudence to postpone costly enlargements of plant until you could be more certain of being able to pay the charges on the new capital required?

It is evident that the responsibility of the railway executive in the matter of issuing new securities is imperfectly understood. It has been suggested that in testing their credit the railways

have not tried to place bonds bearing a higher rate of interest.

The assumption seems to be that a railway company is justified in selling bonds on terms which will tempt buyers without reference to its ability to pay the charges thus undertaken. Does it require argument to make clear that only a reputation for not doing just that sort of thing would enable a railway executive to secure capital under such conditions? He might do it once; he could hardly do it twice. Railway credit, like like individual credit, depends upon character and performance extending over long periods. It is not enough that under existing traffic conditions the obligations assumed in raising new capital could be met. The executive must consider whether or not existing conditions are reasonably certain to continue. At the present time he has no way of knowing to what lengths compulsory expenditure will be further imposed upon him or how far governmental decrees will continue to depress the schedule of freight rates.

To ask of the carriers an enlargement in their plant without provisions for additional net revenue for a return on the required investment of new capital is to exact of them what they cannot perform.

Professions of a willingness to grant the carriers adequate revenues, while welcome as an evidence of public friendliness, are only of practical value when translated by rate-regulating tribunals week in and week out into action which, while making the necessary readjustments, will protect the roads against depletion of gross revenue. For railway commissioners to grant an increase or deny a reduction in rates in a specific territory affecting particular shippers requires courage, for it may invite criticism, opposition and perhaps retaliation. They have in this respect now changed places with the railway officials. We have, however, an abiding faith in the fairness of the whole people, and we believe that a policy resting on a sound basis and frankly and fully explained to the public would meet with popular approval and general acquiescence.

A large part of the controversies now being decided have, as the parties litigant, not the railways, but rival communities. They are less concerned in the amount of the rate than in the establishment of the competitive situation to their satisfaction. Has not the time come when the adjustment of rate situations of this type should be accomplished without reducing the revenue of the carriers? The rate structure has grown up with the country. Time has made it desirable that some rates which are too high should be reduced and that others which are too low should be raised.

But in the gradual correction of these inequalities is it in the public interest that the process should involve a continual scaling down?

The Interstate Commerce Commission, in denying rate advances to the Eastern and Western trunk lines in February, 1911, announced that they were prepared, if the schedules in litigation should not be voluntarily withdrawn, to enter for the usual two years the rates then existing. May this not be taken as an official declaration that the schedules at that time in force were not producing revenue unreasonably large?

If this be conceded, then is it not clear that every rate readjustment should be effected only with a full recognition of the necessity and the justice of maintaining such tariffs as will meet not only expenditures on the scale current at that time, but also the rising expenditures due to necessary enlargement of plant for meeting the public demand, with attendant increase in capital charges, and to the miscellaneous obligations already enumerated, over many of which the railway manager has no control?

Surplus there must be if a railway is to attract capital for additions and betterments. It is of small consequence to the railway company that a first mortgage bond already issued sells at an undiminished price in passing from one private holder to another. Says the Hadley commission:

"Nor can the security which most of our railways offer be regarded as exceptional. The underlying bonds of the older systems are doubtless secure. It is not probable that even a grave commercial crisis will affect the return of a trunk line first mortgage. But very little of the new capital can be raised on securities of this kind.

"Most of it must come either from bonds which will not be a first lien for many years or from new issues of capital stock.

"The investors in these securities, and especially in stocks, take risks which cannot be accurately forecast. Apart from probable fluctuations in traffic and possible increase in cost of operation, new inventions may at any time render much of their present plant antiquated."

The question of railway credit is not what return investors "ought" to regard as attractive, but what return they do regard as attractive; not whether investors of capital, old and new taken together, "ought" to be willing to wait for the return which the new facilities may themselves ultimately yield, but whether they are willing—whether the surplus earned with existing facilities is sufficient to tempt the new capital and thus make possible the new facilities.

The downward trend of rates, occurring parallel with an upward trend of expenditures, must stop somewhere. It were well to survey the situation and find out where that point is before the country is taken through another period of congestion and embargo like that of 1906 and 1907, which is still fresh in the minds of business men. It is imperative that the investing public should be convinced that those responsible for regulation appreciate that the railway system of the country is unable to bear, without injury to itself or to the public, a further depression in freight rates.

WHAT THE PUBLIC MUST UNDERSTAND.

A new national policy as to railway freight rates having lately been laid before the country by a federal commission, including among its members a cabinet officer, an Interstate Commerce Commissioner, and the president of Yale University, and speaking unanimously, it is important that the public and the regulatory tribunals shall adopt that policy and forthwith put it in effect. The Railway Securities Commission makes this significant declaration:

"The necessary development of railway facilities is now endangered by the reluctance of investors to purchase new issues of railway securities in the amounts required. This reluctance is likely to continue until the American public understands the essential community of interest between shipper and investor, and the folly of attempting to protect the one by taking away the rewards of good management from the other.

"Neither the rate of return actually received on the par value of American railway bonds and stocks today, nor the security which can be offered for additional railway investments in the future, will make it easy to raise the needed amount of capital.

"The ratio of interest and dividends to outstanding bonds and stocks of American railways is not quite 4½ per cent. in each case. The average ratio of dividends to the capital of national banks is between 10 and 11 per cent.

"There is a widespread belief, based on imperfect examination of the evidence, that the amount of capital needed for the future development of our railway system is small in proportion to that which has been required in the past; that the profits on such added investments of capital are reasonably well assured; and that we can therefore fix attention predominantly, if not exclusively, on the needs of the shipper without interfering with the necessary supply of new money from the investors.

The Hadley commission goes further:

"A reasonable return is one which, under honest accounting and responsible management, will attract the amount of investors' money needed for the development of our railway facilities. . . . If rates are going to be reduced whenever dividends exceed current rates of interest, investors will seek other fields where the hazard is less or the opportunity greater."

The German locomotive works exported more engines in 1911 than in any previous year, though not many more than in 1908. The reports give not the number, but the weight. There were 58,127 tons of locomotives exported last year, which is more than 45 per cent. more than in either 1910 or 1909, but only 7½ per cent. more than in 1908. About one-ninth of the exports of last year were of light engines, weighing less than 22,040 lbs. Of the whole number of all kinds, 13,711 tons went to France, 7,480 to Spain, 6,150 to Argentina, 5,314 to Roumania, and 2,295 to Turkey.

CONSTRUCTION OF THE MILWAUKEE, SPARTA & NORTHWESTERN.

The largest mileage of new road completed and placed in service by any railway in the United States during 1911 was the portion of the North Western system known as the Milwaukee, Sparta & Northwestern, extending 130.5 miles from Lindwerm, Wis., to Necedah; 23 miles from Wyeville to Sparta, and 8 miles from West Allis to Butler. The branch line which the company had been operating between Wyeville and Necedah, 15.5 miles, was partially rebuilt to form a link in the new road, making a total mileage of 177 miles.

This line serves two important purposes in the development of the North Western system; first, a belt line around Milwaukee connecting with the Northern Wisconsin division near Lindwerm, and with the Madison division near West Allis; and second, a direct low grade connection from Milwaukee to the Chicago, St. Paul, Minneapolis & Omaha at Wyeville and to the Madison division at Sparta. The advantages of the belt line were shown in a description of the construction work on that portion of the line, published in the *Railway Age Gazette* of October 20, 1911.

Considered as a cut-off for western and northwestern traffic, the new line has the double advantage of directness and ease of operation. The distance from Milwaukee to Wyeville by way of Madison is 179 miles. By the new line it is 155 miles. The distance from Milwaukee to Sparta by way of Madison and Elroy is 190 miles; by the new line it is 178 miles. The maximum grade on the old line between Madison and Sparta and between Madison and Wyeville is 1 per cent. in both directions, while 0.5 per cent. is the maximum grade against eastbound traffic on the new line and 0.7 per cent. against westbound traffic. A large amount of curvature and a number of tunnels were also eliminated by the cut-off. The new through route from Chicago to the Twin Cities and upper lake ports, of which this line forms a part, is the same length as the old one. The operating conditions, however, are materially improved, and in addition, the line touches Milwaukee, an important point for both freight and passenger business.

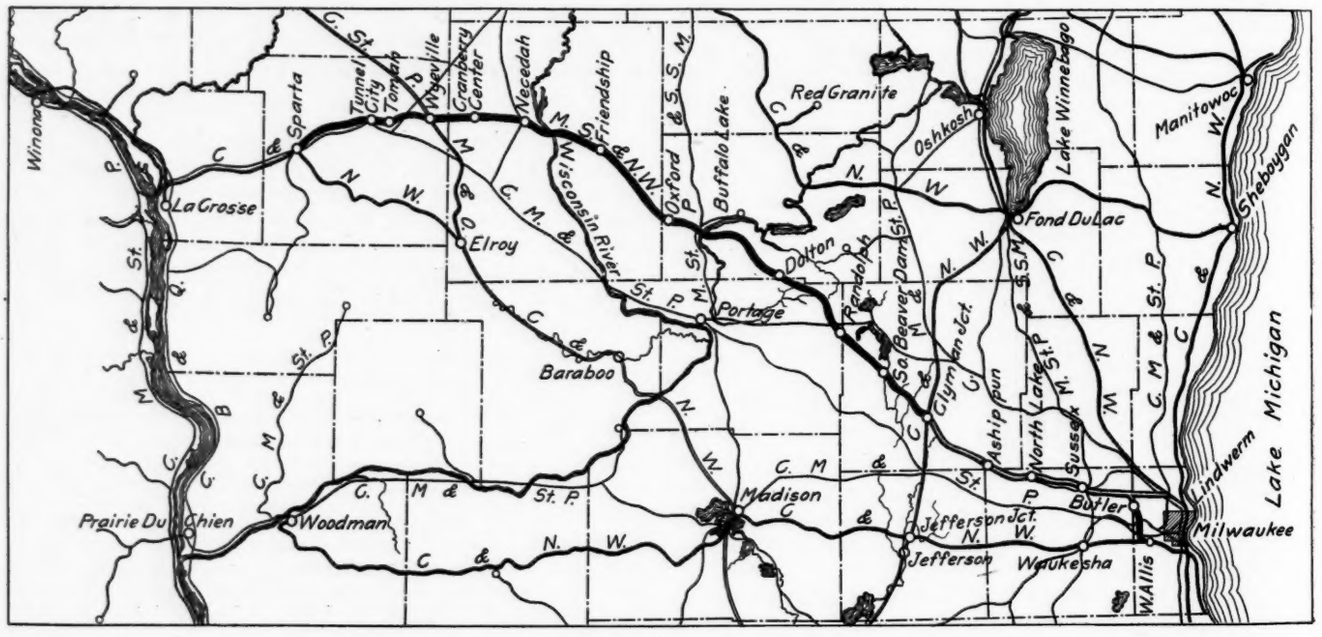
The lower grades allow a considerable increase in tonnage rating over the old line and the movement of through passenger traffic to the Northwest is considerably facilitated. Although the old route through Madison was double tracked, traffic had increased to such a degree that the line was badly congested.

The new line is double track and equipped with automatic block signals east of Clyman Junction, affording a more economical routing for freight from the Northern Wisconsin and Ashland divisions destined through the Milwaukee district than has been available with the 1 per cent. line between Fond du Lac and Milwaukee. In addition to the industrial development which is anticipated on the belt line, the new road will serve a considerable territory that has not before been reached. That portion of the line between North Lake and Necedah, about 109 miles, has practically no competition from other railways in serving the farming country traversed. Construction work on the new road was started in March, 1910, and it was opened for traffic December 11, 1911.

ROADBED.

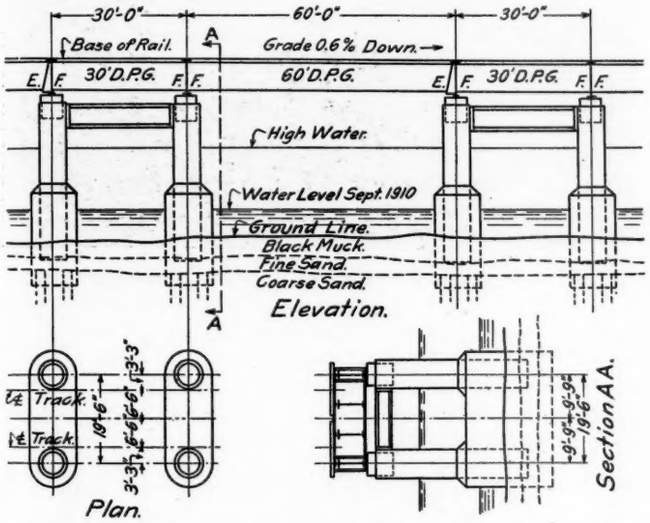
The route through central Wisconsin followed by the new road marks roughly the division between the rolling land of the southwestern portion of the state and the marshes of the lake country. In many cases the roadbed is built alternately across the points of swamps and through cuts in the noses of the hills. The soil on the eastern end is predominantly clay, and that on the western end sand, the division being approximately at the crossing of the Fox river, 75 miles from Milwaukee. The profile is undulating, the maximum difference in elevation being 380 ft. with four summits. All grades are compensated .05 per deg. for curvature. The maximum curvature is 3 deg., and the majority do not exceed 2 deg. The line east of Clyman Junction is graded for double track, and west of that point for single, although provision has been made in the substructures of all permanent bridges for future double track. The standard roadbed is 33 ft. wide for fills and 39 ft. wide for cuts on double track, the corresponding dimensions for single track being 20 ft. and 26 ft. The grading on the section of the line east of Clyman Junction averaged about 80,000 yds. per mile, and for the section between Clyman Junction and Buffalo Lake, about 50,000 yds. per mile. The only heavy excavation required on the west end was that in the approaches to the tunnel at Tunnel City, where an extreme depth of 140 ft. in the east approach cut was reached.

There was little of unusual interest in the grading, most of which was handled by contract in small sections. One contractor working near Necedah used a drag line excavator to very good advantage. This machine is shown in one of the photographs reproduced herewith, working on a fill of considerable length, which was made from a wide shallow borrow pit, for which such a machine is particularly fitted.



General Map of Milwaukee, Sparta & Northwestern and Connecting Lines.

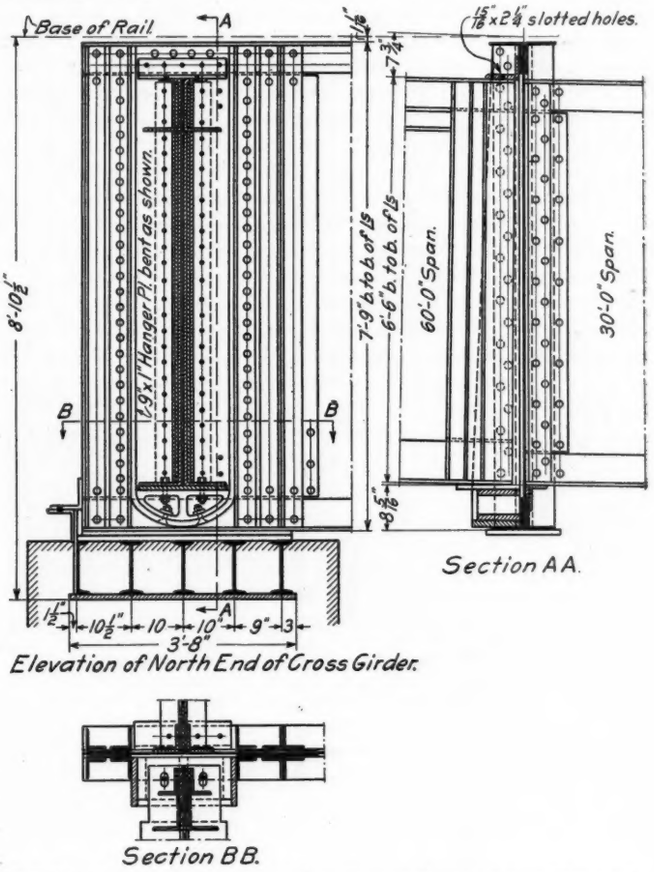
Less trouble was experienced with sink holes in the construction of the new road than is usual in country similar to that traversed. One of the worst sink holes encountered was near North Lake, in which 400,000 yds. of filling material was required in a distance of about 3,500 ft. The grade line at this point was about 20 ft. above the natural surface, and soundings showed soft material as deep as 90 ft. below the surface. The roadbed was finally completed by trestling, although considerable trouble was caused by the trestle sinking and coming up again outside of the right of way. A small bridge on a branch line of the Chicago, Milwaukee & St. Paul, which is parallel and closely adjacent to the new road at this point, was pushed about 20 ft. out of line by the fill made in this sink hole, and required considerable additional work for its replacement. At another point where soundings showed soft bottom in a small swamp shallow ditches were dug parallel to the center line and about 40 ft. each side of it, so that when track was laid across and the fill carried up a few feet the surface broke along these lines and the fill dropped vertically instead of breaking irregularly along one side and turning over, as is frequently the case under similar conditions. In hay marshes ditches were dug 200 ft. from the center line to serve as fire breaks.



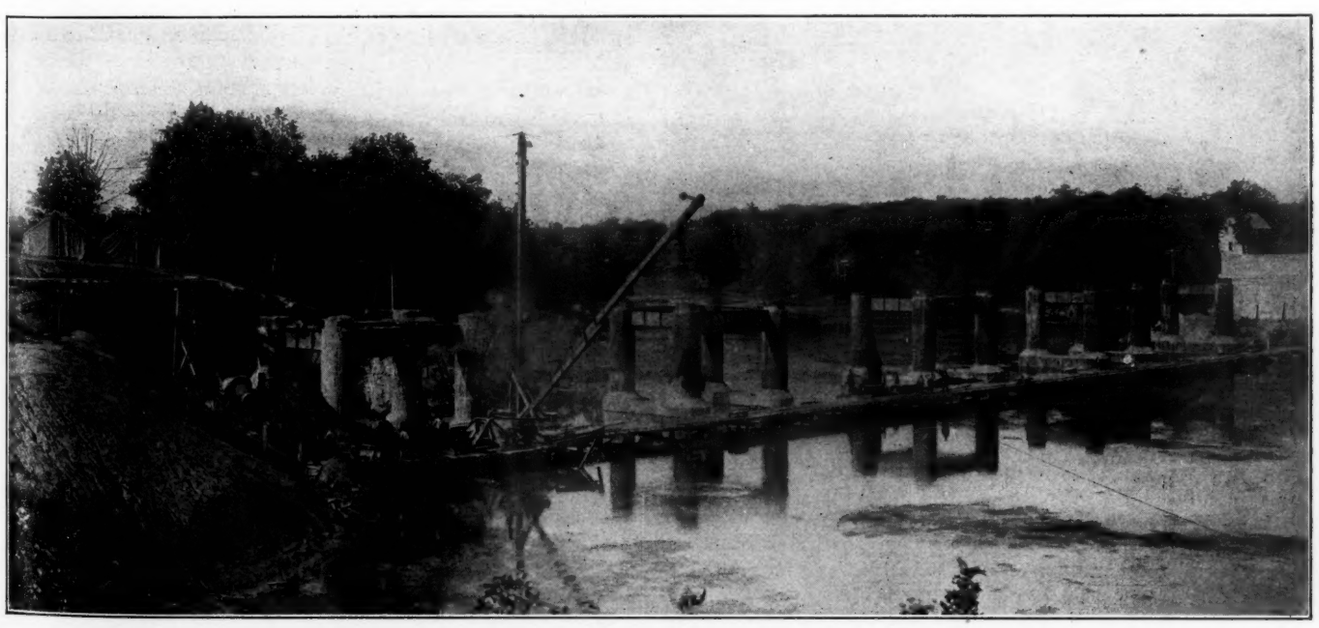
General Design of Oxford Mill Pond Cylinder Pier Bridge.

BRIDGE WORK.

Highway grade crossings were eliminated as far as possible in the construction of the new road, overhead crossings being of temporary construction, pile or frame trestles, and undercrossings being of concrete or steel. There are seven overhead crossings with the Chicago, Milwaukee & St. Paul and one with the Minneapolis, St. Paul & Sault Ste. Marie. The only railway grade crossings are at Clyman Junction, Wyeville and Tomah, the first two being with the company's own lines, and the third



Details of Fixed and Expansion Connections of Longitudinal to Transverse Girders.



Sub-structure of Oxford Mill Pond Bridge, Showing Cylinder Piers.

with the Chicago, Milwaukee & St. Paul. Cast iron pipe was used for small culverts and concrete boxes and concrete arches for larger openings. One of the largest arches was that over the Menominee river near Butler, described in the former article on the Belt line. The concrete work on the eastern half of the road averaged 1,200 yds. per mile east of Clyman Junction, and 500 yds. per mile west of that point. To provide for future double-tracking, the through steel structures and all permanent sub-structures were designed for double track. Superstructures of deck spans are for single track at present. Concrete was used throughout for abutments and piers, the tendency being in most cases to favor mass in preference to heavily reinforced designs.

A type of U abutment used for a number of highway crossings is shown in one of the accompanying drawings. Comparative estimates for this type and for wing abutments were made for locations in high fills, the advantage of the U type being apparent in most cases. For crossings on excessive skews it was necessary in some cases to provide retaining walls at the toe of the slope to prevent encroachment of the fill on the highway. The side walls are non-reinforced, except for twenty-nine ¾-in. square bars 9 ft. long used as bonds to the front wall. Three tie walls are provided to resist the outward thrust of the earth embankment, these walls being 3 ft. thick and 31 ft. 6 in. high, reinforced by twenty-six ¾-in. square rods in each wall extending into the side walls to within one foot of the outer surface. The footing is 4 ft. thick carried down to rock and designed for an average bearing of three tons per square foot. The top of the abutment is open, the entire space between the walls being filled with earth which directly supports the track. To prevent the formation of voids this fill is compacted in place for a depth of 6 ft. over the footings. Openings at the bottom of the partition walls 4 ft. wide and 5 ft. 6 in. high are provided for the convenience of workmen during the construction of the abutment. Drainage is provided for by cast iron pipes in the side walls placed as shown in the drawing, and the interior of the abutment is waterproofed with an asphalt mastic compound. The top of the footing is sloped ⅛ in. in 1 ft. from back to front, drainage collecting over this area being carried through the front wall by a 6-in. cast iron pipe, the outer end of which is covered by broken stone. The two abutments for the location shown required 2,492 yds. of concrete and 12,600 lbs. of steel.

In addition to the new bridge work, the extension of three permanent bridges on the old line near the connection at Lind-

Wisconsin River Bridge, Near Necedah, Wis.

werm was made necessary by the double-tracking of the old line from that point into Milwaukee.

The most important stream crossings are over the Wisconsin river, Yellow river, Fox river and Oxford mill pond. The Wisconsin river at the point of crossing flows between a high sandstone bluff on the east bank and a low valley on the west. At times of high water this valley is flooded for a considerable distance back from the channel, and shortly after the completion of the new grade and the placing of the bridge abutments, an unusually high water stage seriously damaged the new bank back of the west abutment. To prevent the recurrence of trouble from this source a dike was built about 1,100 ft. west of the west

Yellow River and C. M. & St. P. Crossing.

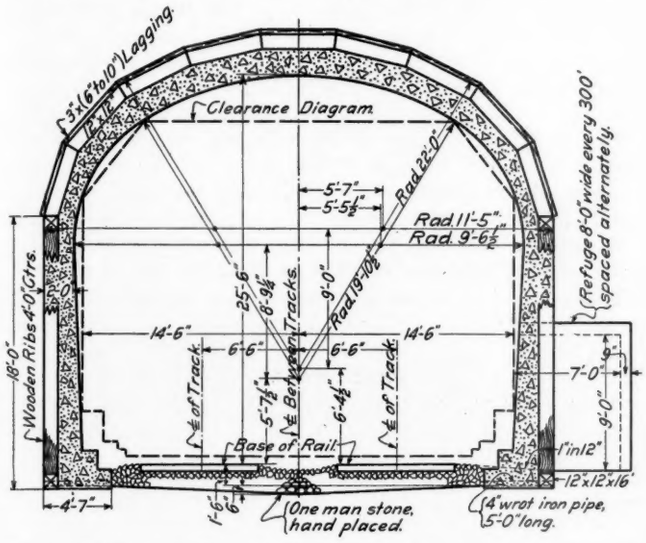
abutment, paralleling the river for a distance of 8,000 ft. up stream. The river slope of this dike and the upper slope of the grade supporting the track were protected by riprap. The dike is 8 ft. wide on top with a 2:1 slope on the river side and a 1½ : 1 slope on the opposite side. The fill was made by scraper outfits from borrow alongside and riprap was brought in by dinky engines and cars from a nearby stone cut on the new railway line. The riprap was dumped to place and roughly smoothed by hand to a depth of 2 ft. The bridge consists of six 80-ft. deck plate girders and four 150-ft. through lattice riveted truss spans, making a total length of 1,096 ft. 9 in. face to face of back walls.

The Yellow river bridge consists of a 150-ft. through riveted lattice span. a 78-ft. through plate girder, and three 69-ft. 4½ in. deck plate girders, making a total length of 440 ft. The through girder spans a single track line of the Chicago, Milwaukee & St. Paul, and a public highway.

The Fox river at the point of crossing widens to a shallow lake known as Buffalo Lake, which is underlaid with soft muck. The main channel of the river is navigable and is crossed by a double track through riveted swing bridge 205 ft. 6 in. long, providing two 75-ft. clear channels. In addition to this swing span, the bridge consists of eight 60-ft., eight 30-ft. and two 40-ft. deck plate girders. The piers, excepting those under the swing span, consist of two steel cylinders 8 ft. in diameter, filled with concrete. The cylinders at eight of these piers are carried down to hard material, and at the other eight they are supported on clusters of piles driven in the overlying sand and clay. Sixteen piles were used in each cluster, driven on concentric circles with a minimum spacing of 1 ft. 8½ in. The pressure under the piers founded on hard material is 6.2 tons per square foot, and the pressure on each pile in the pile-supported cylinders is 35,800 lbs. The tops of the 8-ft. cylinders are just above the elevation of high water, the superstructure being carried on 6-ft. sections of 5-ft. diameter cylinders set concentrically in the top of the large cylinders, and extending about 3 ft. above them. The cylinders are spaced 19 ft. 6 in. apart center to center between rows and alternately 30 ft. and 60 ft. center to center between cylinders in each row, the adjacent pairs of cylinders being connected by the superstructure to serve as towers. The columns supported on the cylinders are braced diagonally in both directions in each tower and support the transverse plate girders on which are carried the longitudinal girders under the tracks. This construction is clearly shown in one of the accompanying drawings. In placing the cylinders they were floated out to the desired location and sunk through the muck by weighing them with rails and dredging out

the enclosed material. They were then filled with 1:3:6 concrete.

The bridge over Oxford mill pond was designed to use the type of cylinder piers and tower superstructure described above.



Cross Section of Tunnel, Showing Timbering and Concrete Lining.

Owing, however, to a proposed water power development which, if installed, will materially raise the high water level, this design had to be modified. The condition of foundations was such that all piers had to be founded on piles. In place of two 8-ft. cylinders a single steel form of oval cross sections was used for the base of the piers. This form was 10 ft. wide and 29 ft. 6 in. long, with semi-circular ends, built up of 5/16 in. open hearth structural steel plates with riveted lap joints. Concentric with the semi-circular ends were placed 6-ft. diameter cylinders 33 ft. 7 in. high. The superstructure was carried directly by 6-ft. sections of 5-ft. diameter cylinders as described in connection with the Buffalo lake bridge. The large cylinders and the oval forms are filled with 1:3:6 concrete and the small cylinders supporting the superstructure with 1:2:4 concrete. The tops of the large cylinders are braced in both directions by plate girder diaphragms which make the four cylinders act as a rigid tower. The superstructure consists of transverse plate girders connecting each pair of cylinders and supporting longitudinal deck plate girders in the manner shown in one of the accompanying drawings. The 30-ft. longitudinal girders are made rigid at both ends. At the expansion ends of the 60-ft girders a special design of hanger plate was used. The end of the girder rests directly on a casting, whose lower surface is curved and is supported by a 9-in. x 1-in. hanger plate extending up to the top of the transverse girder and riveted to the stiffener angles. The lower flange of the longitudinal girder is bolted to this casting, but the holes are slotted to provide for necessary expansion.

TUNNEL WORK.

The only tunnel on the new line is through the divide between the Mississippi and Wisconsin river basins, about 12 miles east of Sparta. It is 1,300 ft. long and double-tracked, the cross section being shown in the drawing reproduced herewith. The tunnel was driven through soft sandstone, the maximum depth above the arch ring being 182 ft. Deep rock cuts approach the tunnel from both directions, the maximum cut being about 140 ft. These cuts were sloped ½ : 1 in the layer of loose material near the ground surface and ¼ : 1 in the solid rock. The first headings were driven at the height of the wall plates, and these were enlarged to the full arch section. The timbering consisted of nine

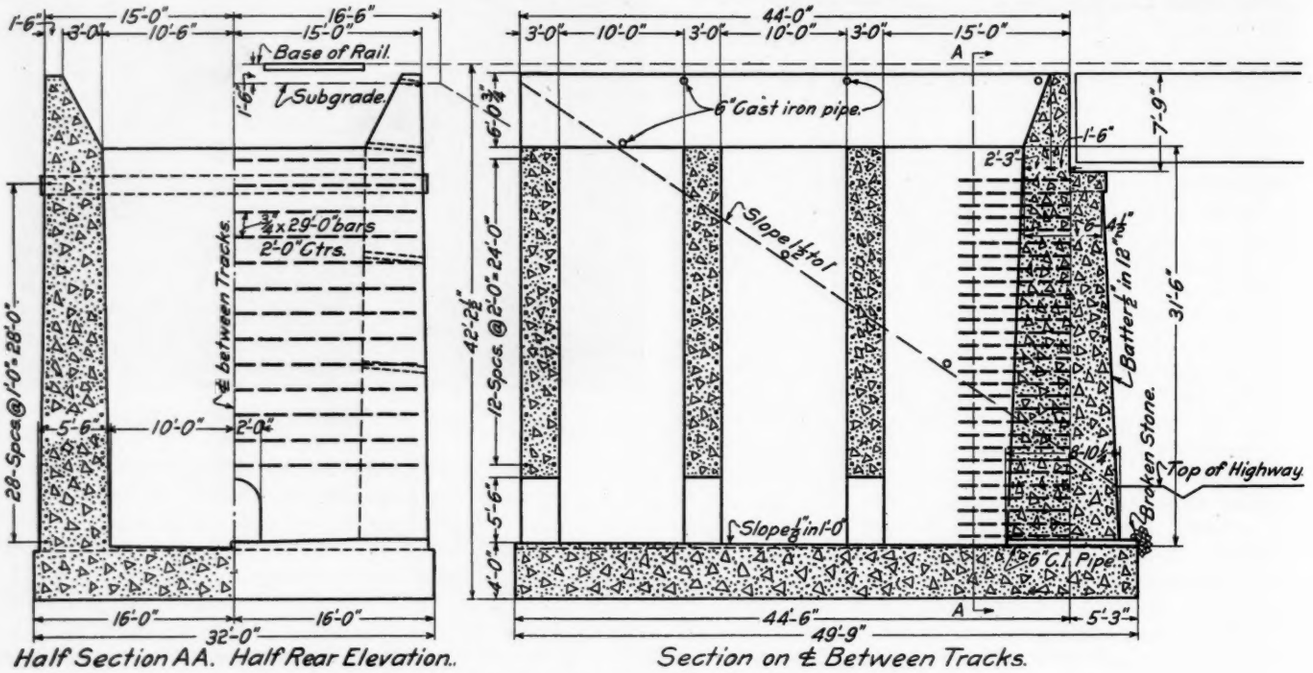
East Portal of Tunnel, Tunnel City, Wis.

12-in. x 12-in. arch ribs and 3-in. lagging supported on 12-in. x 12-in. wall plates 16 ft. long. All falls over the arch were packed with cord wood tightly wedged, the stone being too soft for this purpose. The lower part of the tunnel section was taken out in a single bench. Light charges of 40 per cent. Monobel dynamite which produced practically no fumes were used, the rock being so soft that it shattered very easily. There was no difficulty in handling the drilling rapidly, as in some places the material was so soft that augers could be used. The rock shot down from the

Cylinder Piers for Buffalo Lake Bridge; Milwaukee, Sparta & Northwestern.

working face was shoveled into 1-yd. narrow-gage cars running on a track laid on the center line of the tunnel and hauled out by mules, usually in 8-car trains. Work was carried on from both portals, working two shifts at each end. About 140 men were required for each shift, the excavation averaging about 16 trainloads per shift. The total excavation was approximately 45,000 yds.

A mixer plant was established at each portal for placing the concrete lining. At the east end concrete materials were unloaded at Tunnel City, where stock piles were maintained and provision was made for heating during the cold weather. From these stock piles the material was hauled by dump wagons over a new road crossing over the portal of the Chicago, Milwaukee & St. Paul tunnel, which is adjacent to the new one, and dumped over the mixer location into chutes leading to storage hoppers. From these hoppers the mixer feed could be properly proportioned, the elevation of the plant being such that all handling of materials was done by gravity. The mixer dumped on the level of a trestle extending into the tunnel about 20 ft. above the base of the rail. At the west end the material was unloaded from a siding at the end of the approach cut, a stiff-leg derrick being used to unload gravel and stone from cars, and a clamshell to load small dump cars from the stock pile. These dump cars had a capacity of 3¼ yds., and each was hauled up a steep incline to a point over the mixing plant near the portal by a team of horses. Here the material was dumped into chutes hoppered at the bottom to control the mixer supply in a manner similar to that described at the other plant. The gravel chute was heated by four pipes laid on the floor of the chute up and down the incline and supplied with live steam from a boiler at the top. A cement storage house was also provided above the chutes, and the sacks of cement were dropped to the mixer platform in a wooden chute as needed. Smith mixers of ¾-yd. capacity were used in both these plants, the mix being 1:2:4 of gravel and broken stone. The concrete was carried into the tunnel in push cars with an average capacity of about 15½ cu. ft. The footings and side walls were placed directly from these dump cars through wooden chutes. The lower part of the arch was placed by dumping the cars to boards, from which it was shoveled into the forms, one form board being added at a time. The key section of the arch was placed by shoveling back into 4-ft. sections of the forms. This section was 3 ft. wide, placed in two pieces, which were bolted together and wedged tightly in place. Every second section of wall plate between posts was cut out and the space filled when the side walls were placed. The side walls were concreted in sections 70 ft. long and the arch in 16-ft. sections. The contractor's typical concrete gang at the west plant consisted of 12 men operating the three push cars, 6 spaders, 16 carpenters, 9 shovelers, 2 foremen, 2 men operating the feeding hoppers at the mixer, one dropping down cement sacks from the storage house, one engineer for the heating boiler, one engineer at the mixer and one operator at the mixer. In addition to these, 8 men and 4 teams were required to operate the four dump cars supplying the material from stock piles to mixer, and several other men were required around the stock piles for unloading the material, blacksmithing and caring for the camp. This gang could place about 100 yds. of concrete in a 10-hour shift. Actual construction work on the tunnel was begun about April 15, 1911, and it was opened for traffic January 14, 1912.



Details of Typical U Abutment for Short Plate Girder Spans.

TRACK WORK.

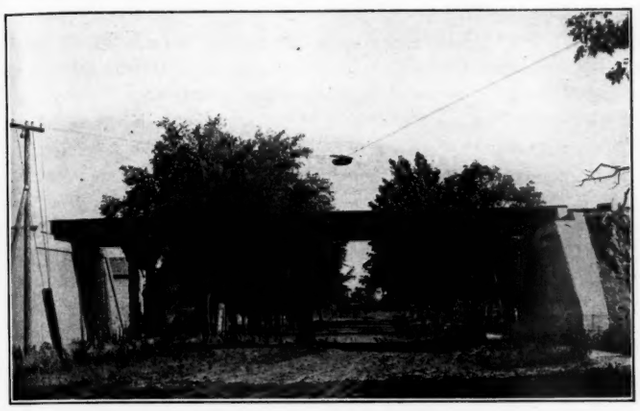
The line is laid with 90-lb. rails on treated hemlock ties. It is double-tracked from Clyman Junction to Butler, and single-tracked for the remainder of the distance, although, as mentioned above, provision has been made in all permanent structures for future double-tracking. There are two yards and engine terminals on the new road, one at the crossing at Wyeville, and one at Friendship. Trains between Milwaukee and St. Paul use the Wyeville terminal, and those between Milwaukee and Winona change engines at Friendship. The former yard has 10 tracks 3,000 ft. long, an 18-stall engine house and an 80-ft. turntable. The latter yard has, in addition to a similar layout of ten 3,000-ft. tracks, a separate caboose and repair yard and a receiving yard of four 3,000-ft. tracks. The engine house at this point has 24 stalls. Both engine houses are of the company's standard brick construction on concrete foundations. At Clyman Junction four Y's are provided for connection with the old line in all directions. The typical passing track layout on the single track section is shown in an accompanying sketch. Passing tracks are 3,400 ft. long in all cases.

STATIONS, COALING AND WATER PLANTS.

The standard stations used at the new towns established along the line are of frame construction 20 ft. x 72 ft., having a waiting room, office, and combined baggage and freight room. Plat-

forms are 200 ft. long, constructed of brick in front of the buildings, and of gravel fill covered with a layer of granite screenings at the ends. A concrete curb is used along the brick station and a wooden curb along the gravel. Two other standard stations of larger dimensions are used at towns, where prospective passenger traffic seems to warrant their construction.

Coaling plants are located approximately 50 miles apart, and water stations 17 miles apart. The coaling plants are of the balanced bucket type. Water stations located inland secure a supply from 12-in. deep wells. The stations at Friendship and Butler



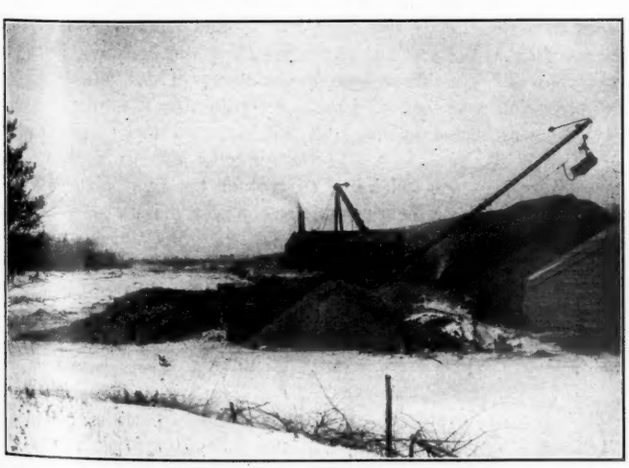
Standard Steel Highway Crossing.

are operated by electricity, and all others by gasoline. No water softeners were required.

SIGNALING AND INTERLOCKING.

The line from Clyman Junction to Butler, 18 miles, is equipped with automatic block signals, the remainder being provided with standard train order signals. Two mechanical interlocking plants were installed, one to protect the drawbridge at Fox river having 15 working levers in a 24-lever frame, and one at the C. M. & St. P. crossing near Tomah having 12 working levers in a 16-lever frame. Two electric plants were installed, one of 36 working levers in a 48-lever frame governing the crossing of the Chicago & North Western at Clyman Junction, and one of 49 working levers in a 64-lever frame at the crossing of the Omaha Line at Wyeville.

All construction work on the new line was handled by contract.



Drag Line Excavator Making Long Fill from Adjacent Borrow Pit; Milwaukee, Sparta & Northwestern.

The John Marsh Company had the general contract for the line east of Clyman Junction, and Winston Brothers for the portion west of that point. The work was done under the supervision of E. C. Carter, chief engineer, and under direct charge of W. H. Finley, assistant chief engineer. D. Rounseville was resident engineer in charge of field work east of the Fox river, and F. H. Bainbridge west of that point. L. J. Putnam was in charge of the tunnel work, and was later made resident engineer, succeeding Mr. Bainbridge. The bridges were designed under the direction of Mr. Finley and I. F. Stearn, formerly bridge engineer of that road.

TRAIN ACCIDENTS IN JANUARY.[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of January, 1912. This record is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
1.	Denver & R. G.	Salt Lake.	bc.	F. & F.	2	3
2.	Wabash	Brooklyn.	rc.	P. & F.	0	8
3.	Rock Island	El Reno.	bc.	P. & P.	1	20
3.	Georgia & F.	Normantown.	bc.	P. & F.	0	6
5.	Atchison, T. & S. F.	Wright, Kan.	bc.	P. & P.	2	18
6.	Long Island	Hempstead.	xc.	F. & F.	1	1
*6.	Pecos & N. Tex.	Hereford.	rc.	F. & F.	1	3
*7.	Grand Trunk	Durand.	rc.	P. & F.	0	1
8.	L. S. & M. S.	Cleveland.	xc.	F. & F.	0	4
8.	Chi., R. I. & P.	St. Joseph.	rc.	F. & P.	0	12
9.	L. S. & M. S.	Dunkirk.	rc.	P. & F.	0	3
9.	L. S. & M. S.	Ripley.	rc.	P. & P.	0	2
11.	L. S. & M. S.	Chicago.	xc.	P. & P.	0	10
11.	St. Louis & S. F.	Fort Smith.	xc.	P. & F.	0	12
*12.	N. Y. N. H. & H.	E. Freetown.	rc.	P. & F.	1	2
15.	A. C. L. / G. S. & F.	Valdosta.	xc.	P. & F.	0	3
15.	Pitts. & L. E.	New Castle.	bc.	P. & P.	5	5
16.	L. & Nash.	Long Run.	bc.	P. & F.	4	17
*†16.	St. Louis S. W.	Illmo.	rc.	F. & P.	1	0
†18.	Central of Ga.	Jonesboro.	bc.	P. & F.	5	3
18.	West. Md.	Parter's.	bc.	P. & F.	1	2
20.	Pere Marquette	McCord.	rc.	F. & F.	0	6
†22.	Ill. Central	Kinmundy.	rc.	P. & P.	4	3
†23.	Del., Lack. & W.	Chenango Forks.	rc.	P. & P.	2	5
24.	Grand R. & Ind.	Sand Lake.	xc.	F. & F.	2	4
26.	Central of Ga.	Leesburg.	bc.	P. & F.	4	8
29.	Grand Trunk	Durand.	rc.	F. & F.	2	3
31.	Atch., T. & S. F.	Watrous.	bc.	F. & F.	3	2

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd.	Inj'd.
*1.	Wabash	St. Peters.	unx.	P.	0	14
†2.	Minn. & Int'l.	Farley	d. switch.	P.	1	13
3.	Texas & Pacific.	El. Paso.	b. flange.	P.	..	..
4.	Chicago Gt. West'n.	Welch.	b. rail.	P.	0	0
5.	Lake Shore & M. S.	N. Olmsted Fs.	unx.	P.	0	0
6.	Seaboard A. L.	McKenney.	eq.	P.	0	3
7.	Nor. Pacific	Little Falls.	unx.	P.	..	..
10.	Great Northern	Java.	avalanch.	F.	2	0
10.	Central Ga.	Americus.	d. track.	P.	0	1
11.	Penn.	Lime Lake.	b. rail.	P.	0	12
*14.	Missouri Pac.	N. Lyndon.	d. bridge.	F.	3	3
14.	C., C., C. & St. L.	Carey, O.	d. track.	P.	0	34
19.	Penn.	Davis, Ind.	b. rail.	F.	0	0
29.	Penn.	Phila. (*y*)	b. rail.	F.	1	2

y On a yard track.

Other Accidents.

Date.	Road.	Place.	Cause of Accident.	Kind of Train.	Kil'd.	Inj'd.
26.	N. Y. Central.	Oneida.	boiler.	P.	1	1

The collision near Salt Lake City, Utah, on the 1st, about 9:15 p. m., was between eastbound freight train No. 52, Ogden to Salt Lake, running at about 35 miles an hour and a switching

[1]Abbreviations and marks used in Accident List:

rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

engine running west. Both engines were wrecked. The fireman and a brakeman on the switching engine were killed and three trainmen were injured. The switching engine was on the main track on the time of the freight, having been ordered out from Salt Lake City against the eastbound train by reason of a misunderstanding between the despatcher and a signal repairman who notified him by telephone of the derailment of a locomotive. This repairman, 19 years of age, who was in a signal tower, sent the telephone message at the request of the engineman of the engine which was derailed. He had to first call the Salt Lake City telephone exchange. He had also to telephone to the despatcher of the San Pedro Line. Learning that one of the telephone numbers had been changed, he made inquiry of the "information" operator. Being advised as to the correct number he made his call; but there was a mistake somewhere, and he gave to the D. & R. G. despatcher the message which he says he thought he was giving to the San Pedro despatcher. There was a good deal of noise in the signal tower and the repairman seems not to have clearly understood all of the questions which were put to him. The outcome was that the despatcher thought that a westbound freight train was the one which had been derailed, and he ordered out the switching engine, with some men from the terminal yard, to assist in getting the derailed engine back on the track. But in point of fact, the engine derailed was not obstructing the main track, and the train which the despatcher supposed to be derailed had long since proceeded on its way, and had met No. 52.

The collision at Wright, Kan., on the 5th, was between westbound passenger train No. 565 and eastbound train No. 12. One engineman was killed and the other fatally injured; and the number of passengers injured was 18. The engineman of the westbound train "lost his bearings" in a severe snow storm prevailing at the time, and ran past the switch at which he held orders to take the side track.

In the rear collision which occurred near St. Joseph, Mo., on the 8th, eastbound passenger train No. 72 was run into at the rear by a following freight train, and 12 passengers were injured. The rear car of the passenger train, which was a dining car, was split in two lengthwise. The passenger train had been unexpectedly stopped on an ascending grade.

The collision at Cleveland, Ohio, on the evening of the 8th, was between two engines, without trains, on a sidetrack. A passenger engine which had started for the Collinwood yards ran into a yard engine and both engines were thrown off the track. The collision occurred within 100 yds. of a roundhouse, but a violent wind and snow storm prevailed at the time and men in the roundhouse did not hear the crash. The four men on the engines, two on each, were all scalded or otherwise injured so that they were unable to give an alarm, their plight not being discovered until a brakeman on a passing freight train saw what had happened and got help from the roundhouse.

The collision at Dunkirk, N. Y., on the 9th, occurred about 10 a. m., in a blinding snow storm. An eastbound express train ran into two freight engines coupled together and running backwards to couple to their train. These engines were badly damaged and three members of their crews were scalded. The tracks were blocked for three hours. The passenger train had run past a distant and a home signal set against it.

The collision at Ripley, N. Y., on the 9th, occurred at 6 p. m., in a blinding snow storm. Eastbound fast mail train No. 32 ran into the rear of a train of express cars which had stopped because of some trouble with the engine. The express cars were wrecked and one messenger was injured. A cook and a waiter in the dining car of the fast mail were injured. All four main tracks were blocked until midnight.

The butting collision at New Castle, Pa., on the 15th, was between an eastbound passenger train of the Baltimore & Ohio and a westbound passenger train of the Pittsburgh & Lake Erie; the train of the B. & O. having run over a misplaced switch at Moravia street, and through a transfer track to the main line of the P. & L. E. Both enginemen, both firemen and one baggageman were killed. The collision occurred at 6:30 a. m. The B. & O. train had run about 3,400 ft. on the P. & L. E. track.

The butting collision on the Louisville & Nashville at Long Run, Ky., on the 16th, was between a westbound passenger train of the L. & N. and an eastbound train of the Chesapeake & Ohio, made up of empty passenger cars. Both enginemen and both firemen were killed, and two other trainmen were badly injured. Fifteen of the passengers on the Louisville & Nashville train were injured, but most of the injuries were comparatively slight. The collision was due to the engineman and fireman of the C. & O. train, running as the second section of C. & O. freight train No. 92, overlooking the passenger train, which was running on time on its schedule rights.

The rear collision at Illmo, Mo., on the 16th, occurred at 3:15 a. m., and the only victim was G. L. Stewart, agricultural and industrial agent of the road, who was in his business car at the rear of the passenger train. He was instantly killed. The wreck took fire and his body was badly burned. The collision occurred in the yard and was caused by a freight train of the St. Louis, Iron Mountain & Southern coming into the yard not under control; this train ran into a passenger train of the St. Louis Southwestern which had been stopped because of the detention of a freight train ahead of it. The passenger train was pushed forward about 300 ft. and wrecked the caboose of the freight, which was a train of the Chicago & Eastern Illinois; and the caboose and two cars of the freight took fire and were burned up. The atmosphere was clear at the time of the collision, but the temperature was about 5 deg. below zero. The flagman of the passenger train had gone back about 1,200 ft., and besides using his red light and a fusee he threw his lantern at the cab of the approaching locomotive; but this engine was working steam when it struck the passenger train at a rate of about 15 miles an hour. The fire in the passenger train, which destroyed the business car, and also one sleeping car, caught from the coals in the freight engine.

The butting collision at Jonesboro, Ga., on the 18th, occurred at 1:20 a. m. Both engines were badly wrecked. The engineman of the freight train, three colored passengers and a colored train porter were killed, and three persons were injured. The passenger train was No. 32, and freight train was No. 35. The collision was caused by the men in charge of train No. 35 overlooking train No. 32.

The collision at Kinmundy, Ill., on the 22d, resulted in the death of four railway officers. Southbound passenger train No. 25, standing at the station, was run into at the rear by passenger train No. 3. The block system not being in use, the standing train (which was behind time) according to the rule, should have been protected by flag, but this was not done; neither was any use made of fusees. The engineman of No. 3, however, could have seen the tail lights of No. 25, the line being straight and the atmosphere clear; also there was a distant signal about 800 ft. back of the rear of train No. 25, indicating caution for the crossing at Kinmundy. This engineman had had but brief experience as a runner on passenger trains. This collision was reported in the *Railway Age Gazette*, January 26 and February 2.

The collision of passenger trains at Chenango Forks, N. Y., on the 23rd, occurred at 12:48 a. m. Two passengers were killed and four passengers and the conductor were injured. Some of the passengers were scalded by steam escaping from the steam chest of the locomotive. Train No. 812 was standing just east of the station and was run into at the rear by No. 912. The engineman of No. 912 failed to observe automatic block signals. He disregarded a distant signal in the caution position and a home signal in the stop position, running by the latter and into the rear of No. 812, which was standing about 400 ft. east of the home signal protecting a cross-over. No. 812 had just crossed over and was waiting for the flagman to set the switches in normal position.

The collision at Leesburg, Ga., on the 26th, occurred at 5:45 a. m. It was between eastbound passenger train No. 8 and a westbound extra freight train, engine 1362. It occurred on a straight line, but there was a dense fog preventing either enginemen from seeing the opposing train. Both engines, 1 baggage car, and one freight car were considerably damaged. Both enginemen, one fireman and the freight train conductor, who was riding on engine, were killed, and eight persons were slightly injured. The collision was due to the men in charge of the freight train overlooking the passenger train, which was on time.

The train derailed at North Olmsted Falls, Ohio, on the 5th, was the eastbound Twentieth Century Limited. The forward truck of the dining car, which was the fourth car from the engine, ran off the rails because of a broken tire, and plowed for a considerable distance along the roadbed. The train was running at about 60 miles an hour, but the cars separated so as to cause an emergency application of the brakes, and the whole train was stopped within a short distance.

The passenger train derailed at McKenney, Va., on the 6th, was the northbound day express No. 66; and the engineman, fireman and one passenger were slightly injured. The derailment was due to a breakage of rolling stock. August Belmont, of New York, chairman of the Interborough Rapid Transit Company, who was on the train, sent to engineman W. R. Bishop five hundred dollars in recognition of his courage in sticking to his post.

Canada.—Of five train accidents reported in the newspapers as occurring in Canada in the month of January, and which were attended with fatal results, two were butting collisions and one was caused by an avalanche which overwhelmed a wrecking train. The most serious of these five accidents was a butting collision on the Canadian Pacific at St. Vincent de Paul, 30 miles east of Montreal, on Monday, the 8th. Four passengers were killed and five passengers and two trainmen were injured. It appears that the westbound train ran past the switch at the meeting point, the eastbound having been stopped west of the station.

Electric Car Accidents.—Of the 12 accidents to electric cars reported in the newspapers as occurring in the United States in the month of January, two were attended with fatal results. Near Martinsville, Ind., on the 17th, a butting collision between a passenger car and a work train killed two persons and a third was fatally injured. At Cincinnati, on the 5th, a car fell off the bridge connecting Cincinnati with Newport and lodged on the ground 55 ft. below. The number of passengers in the car was not large, but of these four were fatally injured.

FOREIGN RAILWAY NOTES.

A year or more ago the Austrian State Railways agreed with the producers of petroleum in Galicia to use oil on the Galician lines. Now about 700 locomotives are burning oil, generally with satisfactory results, though there are some complaints of rapid wear. A new process is being tried in which superheated steam is not required for atomizing the oil.

In a speech before the Prussian parliament Minister von Breitenbach said that among the effects of the drought last October was an increase of 6.2 per cent. in freight earnings, with scarcely any increase (only 0.04 per cent.) in the number of cars required. Low water in the rivers gave long rail hauls north and south, and the reduced rates on potatoes, etc., carried long shipments from the extreme East, where there was a good crop, to the West, where there was none to speak of. Though the inability to supply the cars required was chiefly due to this exceptional cause, the German State Railways, whose freight cars are pooled, have agreed to increase their stock 5 per cent. the current year, which will add 28,400 cars to the number by next October.

INTERMITTENT ACETYLENE LIGHTS ON SIGNALS.

E. G. Windahl, writing in the *Tecknisch-Tidskrift,* describes some intermittent lights which have been installed at an interlocking at Liljeholm, Sweden, the installation having been preceded by the experimental use of lights of this kind for a year or two on some signals on the Stockholm, Vesteros & Bergslagen. The apparatus was furnished by the Bolag Gas Accumulator Company.

It appears that the plan under which these signals are arranged provides for the use of intermittent lights for high speed routes and constant lights for moderate speed and diverging routes. At Liljeholm the traffic is dense and all kinds of indications are necessary. Different lights have different rates of periodicity; thus the distant signals show a light one-tenth of a second and are obscured for nine-tenths of a second. Certain home signals are adjusted differently. For example, for three signals the periodicity is 0.5 seconds alight and 0.7 seconds obscured; for one it is 0.5 seconds light and 0.8 seconds obscurity; for another it is 0.4 seconds light, 0.8 seconds obscurity; and for a sixth it is 0.5 seconds light and 0.5 seconds obscurity. These different adjustments were decided on after extended experiments. The station signals for the main line being the only ones provided with intermittent lights, the conductor on starting his train over the main line only needs to look for an intermittent signal and he pays no attention whatever to the constant lights. The starting signals are not kept lighted all the time and thus there is a saving in the expense of operation.

The gas used is purified acetylene, dissolved in acetone, under a pressure of from 150 to 225 lbs. per square inch, and a small accumulator is used. The accumulators in use at Liljeholm have a gross capacity of 915 cubic inches. At each signal there is a tank in a cylindrical shell at the foot of the post. The gas itself automatically opens and closes the valve, at the desired intervals, by which the flame is started and extinguished. The front of the lamp has a lens so arranged that the rays are projected in practically parallel lines. Its openings for ventilation are provided with fine nettings to keep out insects. The lamps have no reflectors and therefore it is not often necessary to open them for cleaning.

The constant lights show green for clear and are obscured when the semaphore arm is in the stop position. Therefore they only indicate clear; and the supply of gas is cut off except when the signal is cleared. The gas is taken through a branch pipe leading into the main pipe between the pressure regulator and the intermittent signal; when the arm is in the clear position the opening in the branch pipe is automatically opened and the gas is lighted by a pilot flame. The opening and closing of this orifice is regulated by means of a membranous valve attached to the signal arm.

The intermittent lights as well as the pilot flames of the constant lights are kept alight night and day and they require no further supervision than that necessitated by the renewal of the tanks and recharging them with gas. Usually these tanks will last about two months for the distant signals. The tanks for the station signals must be changed more frequently because the period of luminosity is longer and the consumption of gas is greater.

The cost of installation runs from $85 to $145 per light, and about $20 additional for each fixed light (on the same post). The expenses of operation have been found to be about as follows: One distant signal (lighted 0.1 seconds, obscured 0.9 seconds) for 24 hours, 0.424 cubic feet. One pilot light 0.353 cubic feet; or, annually, for one intermittent and one pilot light (0.777 cubic feet x 365 x $10.60 per 1,000 cubic feet) = $3.00; renewal of tanks, $0.50; total per year, $3.50. Where the periodicity is 0.5 seconds light and 0.8 seconds obscured the consumption of gas per intermittent light is 1.63 cubic feet. Add for a pilot light 0.35 cubic feet, and the cost per year, including renewal of accumulators is $8.83.

The extinction of the intermittent light for one-half the night

will afford an approximate saving of about $1.11 each year.

The annual expense of a certain starting signal with a periodicity of 0.4 seconds lighted and 0.8 seconds obscured, amounts to about $8.06, with a saving of 70 cents if the intermittent light is extinguished for one-half the night. For a signal with a periodicity of 0.5 seconds lighted and 0.7 seconds obscured, the figures become $12.69 and $1.39, respectively.

NORTHERN PACIFIC TRAIN RULES.

The Northern Pacific has lately completed a revision of its book of rules for the guidance of the employees in the transportation department, including train rules, block signal and interlocking rules and "general regulations." Following the rules for the movement of trains by train orders, there is a brief code (9 rules) of telephone instructions. The "general regulations" include, besides brief chapters for each class of employees, a chapter on each of the following subjects: Air brakes; operation on mountain grades; slow orders and bulletins; safety precautions and casualties; legal proceedings; and prevention of fires. The rules for the different classes of employees are preceded by 20 rules addressed to all employees.

That portion of the book which corresponds to the standard code of the American Railway Association has a number of additions, each such addition being made a supplement to one of the standard rules, and distinguished by a letter (a, b, c, d, etc.). We note such of these additions as are of general interest.

The rules applying to double track lines, as distinguished from single track, are interwoven with the others. These rules are D 5, D 14 (referring only to paragraph k) D 17, D 19, D 71, D 72, D 83, D 85, D 94, D 95, D 97, D 101, D 104a, D 151, D 152, D 153, D 208.

Rule 3a requires conductors, including yard conductors, to compare watches with their enginemen, provides for a comparison by men who have not access to a standard clock, and requires the train despatcher to record daily on the train sheet any variation of the standard clocks.

Rule 7a cautions trainmen, etc., to avoid taking hand signals that may be intended for other trains. In backing a train, the disappearance from view of trainmen or lamp by which signals are given will be construed as a stop signal.

Rule 14, paragraph k, provides for the giving of the whistle signal for the benefit of trackmen and bridgemen.

Rule D 19, requires that when a train is turned out against the current of traffic at night, green lights shall be displayed to the front and side, and that to the rear there shall be displayed a green light on the right hand side of the car and a red light on the left hand side (this for a road where the normal current of traffic is on the right hand track). The cut showing the arrangement is entitled "Rear of train by night running against the current of traffic."

Rule 20a requires the observance of rule 14, paragraph k, and also refers specially to cases where a train being met or passed has green signals. In such cases both trains must give the whistle signal and both must acknowledge.

Rule 27a. When a train is stopped by the absence of a signal light it will be governed by the day indication. On certain branches of light traffic the train order signals are not lighted at night; in these cases every train must positively ascertain the position of the signal.

Rule 32a forbids the sounding of the whistle while passing a passenger train except to prevent accident.

Rule 83a requires conductors to make proper entries in train registers; where an engineman consults the register regularly he must himself fill in his name; where the engineman is not required to consult the register, a copy of the record on the register is to be given to him by the operator or conductor. No train can leave a registering station which has telegraph service without a clearance.

Rule 83b provides for bulletins and regulates their use. When a bulletin is posted the time of posting is to be endorsed and the issuing officer advised. Telegraphic bulletins affecting safety of trains must be repeated.

Rule 90a. On a siding used by trains in both directions, trains must run expecting to meet opposing trains.

Rule 91 prescribes an interval of 5 minutes.

Rule 94a provides that a train held by another between telegraph stations may require the first train passing to carry a flagman to the next telegraph station, if this will not delay an important train. The train carrying the flagman must stop so as to make sure that opposing trains cannot get past him.

Rule 100 is omitted.

Rule 104a requires employees to stand 20 ft. away from a switch when a train is passing over it.

TRAIN ORDERS.

Rule 208a forbids the sending of orders to superior trains at the point of execution if it can be avoided; if not avoidable, special precaution must be taken, and the following notice must be incorporated in the order— ".....gets this order at ....."

Rule 221 is given in both forms, form A and form B; form A for use in manual block territory and form B, apparently, for use in automatic territory.

Rule 221c allows the use of the caution position of a three position semaphore when a 19 order is to be delivered, but not in case of a "middle order" addressed to an operator, nor when the order restricts the superiority of a train and is sent to it at the point where superiority is restricted.

Rule 222a requires clearance cards to be written in manifold, the same as train orders.

MANUAL BLOCK SYSTEM.

Rule 301 prescribes green for clear and yellow for caution, and in block signal communications the abbreviation "yel" means "caution displayed."

Rule 301a. Home block signals are also train order signals. . . .

Rule 317a provides for the use of caution cards under the manual block system. Except in the case of a wire failure, these cards are to be used only on authority of the superintendent; and they are to be numbered, repeated, and made complete, as is done with train orders. Heavy freight trains may be run on cards, following passenger trains, on a heavy continuous ascending grade. Where a passenger train is standing at a station, a card may be given to a following train if its run terminates before reaching the track occupied by the passenger train. Cards must not be used on descending grades, nor during snowy or foggy weather, nor through tunnels. When a train order is given for trains to meet or pass at an intermediate (non-telegraph) station there is to be given to each train a caution card, on which is to be noted the substance of the meeting order. When a train other than a passenger train is standing within the switches at a station, a card may be given to a second class or inferior train at the block station in the rear.

Rule 337 is omitted.

Rule 360 reads: "Block signals do not relieve train and enginemen from complying with rule 99."

Rule 362a reads: "A train may pass a Home Block Signal at "Stop" to do station work, take fuel or water, or enter a siding in advance of the signal, subject to the restrictions of Train Rules; but such train must obtain a clearance card before departing from that station."

AUTOMATIC BLOCK SYSTEM.

Rule 501a describes the arrangement of signals on posts at the right of the track or on bridges, or on bracket posts, etc.

Rule 504 allows a train to proceed without sending a flagman ahead provided the next signal can be plainly seen to indicate proceed.

Rule 505 is omitted.

Rule 508 describes switch indicators and tells how they are to be used.

Rules 509-514 prescribe the procedure at crossovers in automatic block signal territory, etc. Lights will not be maintained on trailing point switches on double track; nor on facing point switches or any switch on single track if the switch is not more than 300 ft. in advance of a block signal. When a train is stopped the flagman need not go back if he can see an automatic signal, at least half a mile back, indicating stop. Under all other circumstances rule 99 must be fully observed in block signal districts.

TELEPHONE INSTRUCTIONS (VERBATIM).

231. Speak directly into the transmitter in a moderate tone.

232. Where jack boxes are used plug must be left disconnected from the jack except when in actual use.

233. To answer a call:—Insert plug in proper jack, take down receiver and *speak name of the station.*

234. To call despatcher:—Insert plug in proper jack, take down receiver and listen; if line not in use, say "Despatcher" and name of your station.

235. Except train orders, which will be made complete in the usual manner, all communications will be acknowledged by "All Right" or "O. K.", followed by name of person receiving them.

236. In transmitting and repeating train orders, the following method will be observed:

Numbers one to nine inclusive will be pronounced, and then spelled thus: 1, O-N-E; 5, F-I-V-E, etc.

In numbers above nine, except time in the body of train orders, the figures will be pronounced separately, and then the whole number pronounced, thus: 1-0, ten: 3-2-5, three twenty-five: 2-3-7-8, twenty three seventy eight: (the figure 0 will be pronounced as though spelled Oh.)

Time in the body of train orders, except in schedule orders (Form G) will be pronounced and then spelled thus: 1-0-3-5; T-E-N T-H-I-R-T-Y F-I-V-E: 6-1-5; S-I-X F-I-F-T-E-E-N.

In transmitting and repeating time in schedule orders (Form G) the figures will be pronounced separately and then the whole number pronounced, thus: 1-0-3-5, ten thirty five, etc.

Names of stations in the body of orders, except when repeating schedule orders (Form G) will be pronounced and then spelled thus: Hawley, H-A-W-L-E-Y; Winlock, W-I-N-L-O-C-K; etc.

Example of order as transmitted and repeated:

Number 1 O-N-E engine 2-1-6-2 twenty one sixty two waits at Missoula M-I-S-S-O-U-L-A until 1-2-3-5 T-W-E-L-V-E T-H-I-R-T-Y F-I-V-E P. M. for Number 6-0-2 six hundred and two engine 2-3-7-8 twenty three seventy eight.

Example of same as written:

No. 1 eng 2162 waits at Missoula until 12 35 twelve thirty five p m for No. 602 eng 2378.

237. Trains should be reported thus:

OS Bluffton Number 1 by 4-2-0; OS Heron extra east 2-7-2-8 by 6-1-0, etc.

Trains may be reported without first calling the despatcher, but the despatcher should acknowledge getting the report by saying "All Right" or "O. K."

238. When in doubt, spell names and numbers. Confusion of similar sounds can be overcome by spelling such letters as T, B and C, etc., thus: T-E-A; B-E-E; S-E-E; etc., when necessary. Repeat until certain of being understood correctly.

239. When circuit is interrupted or selector signal inoperative, operators will cut in frequently in an endeavor to keep in touch with the despatcher.

EXAMINATIONS.

E. J. Hackenberg, trainmaster at Staples, Minn., and chairman of the general examining board, has sent us the following notes concerning the work of revising the rules:

The Northern Pacific book had not been revised since 1900. In this revision the company decided to make the rules conform as closely as possible to the standard code of the American Railway Association, as revised in February, 1911. For this purpose a committee was appointed, consisting of a division superintendent who acted as chairman, a trainmaster who had formerly been a train despatcher, a conductor and an engineman.

In addition to rules covered by the standard code, the new book contains rules applying to the despatching of trains by telephone. Telephones are now used for this purpose on the entire main line of the system, over 1,900 miles. The book contains 160 pages of the same type and size as the official copy of the standard code.

Written examinations on transportation rules at stated periods have long been in vogue on this road, and a written examination was conducted prior to putting the revised rules into effect. For that purpose a series of questions was prepared and printed. There are 420 questions on transportation rules, 53 on the manual block and 53 on the automatic block system, for trainmasters, road foremen, train despatchers, conductors, enginemen and yard foremen. Two hundred and sixty-four questions on transportation rules, 53 on manual block and 53 on the automatic block system are for brakemen and firemen. There are 112 questions on transportation rules and 100 questions on manual block system rules for telegraph and telephone operators, and 57 questions for bridge and track foremen on rules pertaining to their particular duties.

The Northern Pacific comprises twelve road divisions and three terminal divisions. The trains of several other roads use the Northern Pacific tracks between various points and the enginemen and trainmen of such tenant lines were required to pass the examinations, making a total of approximately seven thousand employees of various grades who had to be examined.

A general examination board was formed, consisting of one trainmaster, one inspector of telephone despatching, one air brake inspector, two conductors and one engineman. The trainmaster, the conductor and the engineman had been members of the committee which formulated the rules. This committee prepared the questions for the examinations.

A local examining board consisting of a train despatcher, a conductor and an engineman, chosen especially for their familiarity with the theory and practical application of train rules, was formed for each superintendent's division. These men were examined and instructed by the general examining board, after which they conducted the examination of the employees on their respective divisions.

In examining an employee, he was given a copy of the printed questions and required to write the answers (in a space provided) signing his name and giving his occupation and the date on which the examination was held on the outside cover of the blank.

At first the impression seemed to exist among the employees that it was necessary to repeat the language of each rule "from the book." This was very soon corrected and all were given to understand that what was desired was their answers in their own language, giving the meaning and intent of the rules. Thereafter there was no trouble.

The general examining board visited the local examining board of each division while it was examining employees, spending enough time on each division to see that the examinations were correctly and uniformly conducted, and correcting any wrong interpretations or misunderstandings of any rule. Thus all employees had an absolutely uniform understanding of all rules. The examiners made special effort to know that train and enginemen understood the rights of trains by time-table and train orders, and how and when to properly protect their trains.

The examinations were begun in the latter part of October and were concluded December 31; and the new rules went into effect January 1, 1912.

General News Section.

The International & Great Northern lost 94 freight cars in the fire at Houston, Tex., last week.

The shops of the Northern Pacific at Brainerd, Minn., which have been operated on short time, have been restored to a full time basis.

A fire in the inbound freight house of the Missouri, Kansas & Texas at Dallas Tex., on February 18, damaged the buildings and freight to an amount estimated between $30,000 and $40,000.

The storehouse connected with the shops of the Baltimore & Ohio, at Baltimore, was destroyed by fire on February 22, together with seven carloads of material standing nearby; loss, $100,000.

The Duluth, South Shore & Atlantic proposes to establish in the spring an experimental farm about 30 miles from Superior, Wis., under the supervision of E. W. MacPherran, land commissioner.

Representatives of the rail manufacturers have been invited to be present at a meeting of the executive committee of the American Railway Association on March 20 to discuss methods for improving rails.

The Conference Committee of managers will meet representatives of the Brotherhood of Locomotive Engineers on March 14, in New York, to discuss the proposed wage scale for enginemen on eastern railways.

Plans have been made by the Southern Pacific for the electrification of one of its lines into Portland, Ore., as far south as McMinnville, at an estimated cost of $1,600,000. It is reported that work will be started as soon as the city council passes necessary franchises.

Committees representing the locomotive firemen on 51 railways west of Chicago at a meeting in Chicago have formulated a list of demands for changes in working hours and conditions which have been submitted to a referendum vote, with the purpose of presenting them later to the railway managers.

Farquhar J. McRae, accountant for the Stanley steel investigating committee, made to the committee this week a report in which he declares that the corporation controls 80 per cent. of the country's steel trade; that prices are manipulated through the Gary dinners and that J. P. Morgan & Co. realized $69,300,000 in profits for promoting the corporation.

A report compiled by the pension department of the Chicago, Rock Island & Pacific shows that $65,000 has been paid to employees in pensions since the pension system was established January 1, 1910. Since that date 132 employees have been placed on the pension roll and of that number 16 have died. The ages of the pensioners range from 54 to 73 years.

Suits have been filed in the United States district court at Danville, Ill., against the Cleveland, Cincinnati, Chicago & St. Louis for violations of the federal hours of service law, and against the Southern and the Illinois Central, for keeping live stock in cars without rest, food or water for over 28 hours; and against the Mobile & Ohio for accepting cattle from a quarantined district for shipment.

Mayor Carter H. Harrison of Chicago, in accordance with a resolution of the city council, has appointed a commission to investigate the arrangement of the railway freight terminals in Chicago. As members of the commission he appointed: F. A. Delano, C. H. Markham, S. M. Felton, Charles H. Wacker, H. A. Wheeler, Dr. H. B. Favill, W. H. Bush, A. S. Trude, John L. Cochrane and Aldermen Geiger, Harding and Donahoe.

W. D. Williams, of the Texas railway commission, has addressed a letter to the members of the Texas congressional delegation, urging their assistance in securing the enactment of a law relieving from injunctions issued by the federal courts all state officers engaged in the discharge of official duties imposed by state statutes. The letter contains a lengthy argument in support of a similar letter heretofore addressed to members of congress by the Texas commission.

The central safety committee of the Baltimore & Ohio is making a trip over the western lines of the system for the purpose of meeting the division safety committees and addressing meetings of employees on the importance of promoting safety in railway operation. The addresses are being made by C. W. Egan, chief claim agent, and W. L. Robinson, special inspector of the motive power department; and are accompanied by stereopticon pictures, illustrating conditions which often result in accidents.

A bill has been introduced in the New Jersey legislature to provide for an extensive abolition of grade crossings entirely at the expense of the railways, and it has already been passed in the upper house, by a vote of 15 to 2. The bill was prepared by Senator Pierce, who says that under the proposed law 84 crossings will be abolished each year. He declares that the total cost to the railways (length of time not mentioned) will not be over fifty millions, whereas the railway lawyers say it will be five times that sum.

At a hearing before the legislative committee in Boston this week, representatives of the Southern New England—the proposed Grand Trunk extension to Boston—said that if they must file the plans of their proposed line before securing legislative authority the company could not build, as the filing of the plans would at once be followed by an increase in the prices of lands desired which would be unendurable. The committee voted to allow the company until March 30 to file the maps as required by the law.

Senator Gardner, of Maine, has introduced in Congress a bill under which the government can operate the express package business throughout the country, making it a part of the postal service, and thus throwing the express companies out of business. Representative Sabath has introduced in the House a bill to require the Interstate Commerce Commission to make valuations of the property of the express, telegraph, and telephone companies of the country with a view to having these properties acquired by the government.

The accident bulletin of the Interstate Commerce Commission for the months of July, August and September, 1911, shows the number of persons killed in train accidents to have been 201, and of injured 4,283; a decrease in the number killed of 120, as compared with the same months of 1910. Accidents of other kinds bring the total number of casualties, not including industrial accidents, up to 21,865, or 2,758 killed and 19,107 injured. On electric lines, in addition to the foregoing there were 98 persons killed and 1,094 injured.

The Chicago Association of Commerce Committee on Investigation of Smoke Abatement and Electrification of Railway Terminals has received the first of a series of reports which are to be submitted monthly by the various railways of the city, showing the total movement and tonnage of all freight and passenger trains within the Chicago district, including switching movements. The roads will furnish this data for a period of one year. A firm of chemists has been engaged to make an analysis of the atmosphere of Chicago at various points for the purpose of ascertaining the exact effect of smoke from locomotives.

The Chicago harbor and subway commission on February 21 submitted to the local transportation committee of the city council plans for a subway system of four routes, extending from the central loop district to Lawrence avenue on the north side, Sixty-third street on the south side, South Fortieth avenue and West Twelfth street on the southwest side and North Central Park avenue on the northwest side. The plans include approximately 100 miles of track to be constructed by the city at an estimated cost of $103,200,000, in connection with a system of down-town loops for which plans were reported within the last year.

Educational Department of the Central of Georgia.

D. C. Boy, recently from the Union Pacific, has been engaged by the Central of Georgia to establish an educational bureau for the benefit of the company's employees, modeled after the bureaus of the Union Pacific and the Illinois Central, with which the readers of the *Railway Age Gazette* are familiar.

Economy Campaign on the Chicago Great Western.

W. G. Lerch, assistant to the president of the Chicago Great Western, in an address before employees of the transportation department at a general meeting of the Chicago Great Western Station Agents' Association, held at Oelwein, Ia., on January 27, pointed out a variety of ways in which employees may assist the company in promoting economy.

In urging train crews to exercise care in the picking up and setting out of cars and the loading and unloading of freight at stations so as to cause the least amount of breakage and loss, he showed that during the last fiscal year the amount of loss and damage claims on freight amounted to $127,124 for his road, a sum equal to more than the company's yearly taxes in the states of Minnesota and Missouri. A saving of one-third of this, he said, would more than pay the combined taxes for a year in the states of Missouri, Kansas and Nebraska. He estimated that 40 per cent. of this sum was paid out on account of careless handling of cars by train crews, improper loading and stowing of freight and checking in and out. What are termed "avoidable" accidents, resulting in property damage amounting to $50 and over, cost the company in the fiscal year $30,750, not considering delays to trains and consequent overtime for crews. One-half the total cost of these accidents would equal an amount nearly sufficient to operate the Oelwein terminals for one month. Office and station employees were instructed to be economical in the use of stationery and supplies, of gas and electric light and in the sending of commercial telegrams. He placed the aggregate cost of these items for one year at $130,778, or two-thirds of the amount received by the road for carrying United States mails for one year. One-fifth of the amount, if saved, would have been sufficient to pay the premium for one year on the fire insurance carried on the property of the company.

He showed that the effort to practice economy is carried into the general offices. He said that the use of envelopes for sending mail between the various general offices and of printed letterheads for correspondence among the officials has been almost entirely discontinued. Instead of envelopes, a collapsible canvas package, with the names of the different officers stamped on the folds, is used. This permits them being sent back and forth indefinitely. Plain, inexpensive paper is used for letter writing.

To illustrate how a unit of saving may represent a very large sum if applied to the operations of the entire line, Mr. Lerch showed that one of the company's G-3 engines between Oelwein and Stockton burns about 13 tons of coal, or approximately 1,515 shovelsful each trip, and if by careful and expert firing two shovelsful per mile could be saved this would amount to an economy of 456 shovelsful on a round trip and 586.8 tons in a year, representing a money value of $1,343.77.

The Grand Trunk's March on Boston.

I am well aware that the sincerity of our motives has been questioned; but the Grand Trunk has but one object in view, and that is the necessary authority to construct through Massachusetts and New Hampshire a line into Boston, with the other projected extensions already set forth in our bill. We have no ulterior purpose. We are seeking nothing at the hands of any other railway, and nothing will prevent us from building into Boston except the refusal of the authorities to grant us the necessary rights. We have been urged by merchants and manufacturers who have shipped over our lines for years, to push into Boston, and many New England towns and cities want us to come their way. The Grand Trunk has long been a thorn in the side of the trunk line interests, by reason of its persistent refusal to give up its differential rates. This differential means much to New England manufacturers. Tremendous pressure has been brought to bear upon us, but we have stood firm in our determination to maintain this differential and nothing can shake us from it. Repeated efforts have been made by competitive roads to buy the New London Northern, but it is not for sale at any price. There has been a recent advance in Central Vermont and New London Northern securities.

Grand Trunk is not "an alien corporation." We already operate in New England 700 or 800 miles of road, and in the United States fully 2,500 miles, including steamboat lines. We have fourteen corporations organized under the laws of 12 states. We have shown that we mean business in building a modern railway from Palmer to Providence, at a cost of about $65,000 a mile, and we are just as sincere in our determination to come to Boston.—*E. H. Fitzhugh, President, Central Vermont, in Wall Street Journal.*

Advocate Restoration of M. C. B. Defect Cards.

A strong effort is being made by transportation officers throughout the country to bring about a restoration of the practice of applying M. C. B. defect cards at the time of the interchange of cars. At a meeting of the executive committee of the Chief Interchange Inspectors' and Car Foremen's Association in Chicago on February 10, recommendations to the arbitration committee of the Master Car Builders' Association with respect to changes in the Master Car Builders' code of interchange rules were agreed upon, and in addition resolutions were passed heartily endorsing the undertaking of the American Association of Railroad Superintendents, working in conjunction with the Master Car Builders' Association and the Association of Transportation and Car Accounting Officers, to restore the M. C. B. rules.

The resolutions declare that the Master Car Builders' code represents a signed and binding contract entered into by the executive officers, and that the practice of applying M. C. B. defect cards at the time of interchange in accordance with M. C. B. rules is entirely practicable; and pledge the utmost support of the committee to the end that the M. C. B. code shall be restored at all interchange points. It was ordered that a copy of the resolutions be sent to each member of the association, "that their hearty co-operation may be secured in bringing about this much needed reform effective if possible on April 1, 1912, the date the carding practice becomes effective in Chicago and other important interchange centers."

The American Association of Railroad Superintendents through President E. H. DeGroot, Jr., has called a special meeting to be held in St. Louis, on March 1, for the purpose of aiding in the restoration of the carding practice at as many interchange points throughout the United States as possible, effective on April 1, at the time the practice of carding cars in interchange will be instituted within the entire Chicago switching district. It is understood that many railway officers are desirous of having the plan adopted and that there is strong likelihood that uniform action will be taken as of April 1.

Lost from the Payroll.

William Allen White, editor of the Emporia (Kan.) *Gazette*, lately wrote an article on the subject "How to Handle the Trusts." He took the position that the trust is an economic tendency of the times. "It is part of the human development," he said, "This tendency is bigger than the Supreme Court. It is the heart of humanity growing kindlier and more trustworthy every year. The benefits of the trust in saving money to producers and consumers are too obvious to be lightly thrown aside. Putting men in jail, breaking up combinations, and indicting trust magnates will only muddy the water. It is the evils of trusts, not the trusts themselves, that must be broken."

The Ingalls, Kan., *Beacon* reproduced Mr. White's article and commented thereon, as follows: "It should be remembered that Bill Allen White draws a revenue from the Santa Fe for writing such brilliant articles. The editor of the *Beacon* believes he could dope out just as hot stuff if he had his bread basket well filled."

Yesterday the following letter from Mr. White was received by J. R. Koontz, general freight agent of the Santa Fe: "The enclosed from the Ingalls *Beacon* indicates that I am on the Santa Fe payroll. This is gratifying. I should like to have the man who is signing my vouchers return the money he has been spending all these years. Kindly take this up with your auditor and reply at your earliest convenience."

Mr. Koontz replied: "Dear Mr. White: Nothing doing in the

payroll line. I fail to find any official record of you since the anti-pass law went into effect. The *Beacon* man doubtless jumped to the conclusion that any editor who is not ready to throw the 'interests' into the creek must necessarily be in their employ."—*Topeka State Journal.*

Specification for Steel Postal Cars.

The committee of the postoffice department and that of the mechanical officers of the railways having in charge the preparation of a uniform specification for steel postal cars, met in Washington, February 23. After a brief discussion the specification as previously prepared and printed in circular No. 26 of the Special Committee on Relations of Railway Operation to Legislation dated Chicago, November 16, 1911 (published in the *Railway Age Gazette*, November 24, 1911, page 1049), was agreed to with slight modification by both committees. The first 28 paragraphs, which relate to the construction of the car, remain as before with the exception of the sum of the section moduli of all vertical end members, which is changed from "not less than 35" to "not less than 65." This was the only important modification of the specification as printed. The other minor changes which were agreed to are of such small importance that no formal action or approval by the railways individually was thought necessary. The specification for the construction of postal cars is now in condition for the approval of the Postmaster-General, and the postoffice department has already prepared plans for the interior arrangement of postal cars of different lengths which will be issued to the railways at an early date.

Cost of Carrying Second-Class Mail.

The commission appointed last year by the President to investigate the cost of transmitting newspapers and magazines through the mails, consisting of Justice Hughes, of the Supreme Court; President Lowell, of Harvard University, and H. A. Wheeler, of Chicago, has made its report to the President and he has sent it to Congress, endorsing the recommendations of the commission.

The commission recommends that the rate for newspapers be increased from one cent a pound to two cents a pound. It finds that the cost of handling and transporting second-class mail, in the items of transportation, postoffice cars, railway distribution, rural delivery, and certain miscellaneous charges, was approximately 6 cents a pound for paid-at-the-pound-rate matter (nothing said about distance), and for free-in-county and transient matter each approximately 5 cents a pound; and that upon this basis, as modified by subsequent reductions in the cost of railway transportation, the cost of paid-at-the-pound-rate matter, for the services mentioned, is now approximately 5½ cents a pound, while the cost of free-in-county and transient matter remains as formerly, namely, each approximately 5 cents a pound.

The other recommendations of the commission as to the postage rates on second-class mail are as follows:

1. The rate of 2 cents a pound on copies mailed by publishers to subscribers, to news agents, and as sample copies, and by news agents to their subscribers or to other news agents.

2. The rate of 1 cent for each 4 ounces for copies mailed by other than publishers and news agents; that is, the present transient rate.

3. The present free-in-county privilege retained, but not extended.

The commission also recommended that the cent-a-copy rate for newspapers other than weeklies and for periodicals not exceeding 2 ounces in weight, and the 2-cents-a-copy rate for periodicals exceeding 2 ounces in weight, when mailed at a city letter-carrier office for local delivery, be abolished.

The evidence submitted did not justify a finding of the total cost of transporting and handling the different classes of second class mail matter nor of the cost for different sorts of newspapers and periodicals.

The report says that by the extension throughout the country of the method recently introduced of transporting certain periodicals by freight instead of the usual mail trains, the cost of paid-at-the-pound-rate matter may be further reduced.

To obtain the total cost of transporting and handling the subclasses of second class mail, it would be necessary to add to the ascertained cost as now found, the shares of these subclasses, respectively, in the general postoffice expenses and miscellaneous outlays not directly assignable, for the proper apportionment of which the commission is without adequate data. The plan proposed of charging a special rate for the portions of magazines devoted to advertisements is open to grave practical objections. The amount of space given to advertising is no criterion of the educational value of a magazine; and, if the same provision were applied to newspapers, the attempt to measure the space occupied by advertisements would involve more labor than is consistent with the rapid despatch of the daily press.

The commission is further of the opinion that it would be a mistake to discriminate between newspapers and magazines or other periodicals. So far as educational value is concerned no satisfactory distinction can be made.

It is recommended that the postoffice department keep records showing the cost of service.

New Subways in New York.

The Interborough Rapid Transit Company has filed with the New York Public Service Commission what is understood to be its final offer in connection with proposed new subways; and it is generally believed that the offer will be accepted, terminating negotiations that have dragged tediously through many months.

The plan calls for the construction of a four-borough subway and elevated system costing $112,000,000, half of this cost to be borne by the city and half by the Interborough. The Interborough will expend additional $21,000,000 for equipment.

The Interborough is to be allowed 8.76 per cent. preferential payment on this $77,000,000 new money to be contributed, and on $48,000,000 represented in the present subway system. A similar percentage is allowed the city for interest and sinking fund. After these deductions, the city and the Interborough will share equally all profits. The new leases are to run for forty-nine years, and the present subway lease will be leveled for the same period. The earnings of all Interborough elevated and subway lines are to be pooled. From these earnings there will be deducted first the operating expenses, taxes, etc., and rent upon the existing subway to the city until the system is completed.

Ex-Dictator of Chinese Railways.

Franz Woas, of Wiesbaden, Germany, an engineer who has had much experience in China and still keeps himself informed about what is going on there in the railway line, writes as follows, concerning Sheng, the Ex-Minister of Railways in China, now in disgrace, to the Journal of the German Railway Union:

Sheng Hsuanhi, a man now of about 70, went through the traditional training as mandarin, and after examinations became an official in various departments until in the '80s he was transferred to the traffic and railway service, which previously had been an insignificant attachment to the other ministries in Peking. There he became the vice railway minister, though no proper railway ministry existed. He never was out of China, knows no language except Chinese, and all his intercourse with foreigners was conducted through interpreters. But he was by nature uncommonly alert, and he became in time well informed concerning the transportation and railway questions which, new in China, suddenly became very numerous and important, and came before this man for settlement.

Herewith came the peculiar circumstance, which is genuinely Chinese (or at least has been heretofore), that to him each of these questions was a money question. As new railway enterprises in China territory were continually being projected, he flourished on them and became immensely rich. Without a fixed sum, cash in advance, and promise of future payments, he would not lift his finger. The railway made in Txe Chuan charged him with this to his face, and he could say nothing against it, except, perhaps, that it was the universal custom in China. Thus about 1900 he had become the almighty dictator in all railway matters. He did not live in Peking, but, with notable premonition of the future course of things, took up his residence in Shanghai, and here in the independent domain of the foreign settlements, secured a princely abode, with a special museum of antique Chinese works of art.

Though he drew large profit from private railway concessions, he realized perfectly the great advantages which the Chinese government could obtain from state railways, and as the authori-

ties at Peking began to understand how their power could be secured by such a system, he came forward with a memorial in which he advocated a state system in the most decided way, which, after some hesitation, was adopted by imperial decree, providing for the immediate purchase of the existing private railways.

Meanwhile Sheng had become regular minister of transportation, and his name was transformed to Sheng Kungpao, which has sometimes led foreigners to suppose that there were two Shengs. The Chinese people, or at least the notables, had become familiar with the idea that the great through lines should be in the hands of the central government, but inclined in favor of provincial control for the other lines. Then came another imperial decree assigning the execution of the Canton-Hankow line to associated banks of Germany, France, England and America. This reversed public opinion. The suspicious past of the man who was responsible for these decrees was recalled. They remembered how this man had dealt with railway matters all his life, and always for his own personal advantage. They took it for granted that the whole state railway plan was contrived solely to help this man and other high officials to fill their pockets; and though the people had hitherto endured such things in silence, that time was past. The risings, started by certain secret societies, were prompted by this feeling about the railways.

The scape goat is an aboriginal Chinese institution. Here Sheng Kungpao was the scape goat. The prince regent in the name of the boy emperor decreed that the minister had shamefully betrayed the imperial confidence. He was deprived of all his offices and forbidden to even hold another. Two other high mandarins had signed the decree with Sheng. Nothing was done to them.

Progress on the Grand Central Terminal, New York.

The Grand Central terminal plans, up to June 30 last, had involved an expenditure of $18,500,000. The total cost of excavation to date is $7,067,000. Of the total of 3,094,000 cubic yards 2,147,000 have been excavated and 947,000 or 30 per cent. remains to be finished. Without including cost of the two present power houses electrification costs are as follows (cost of third rail, overhead construction, tracks, ducts and feeders): Within the Grand Central terminal, $200,000; Fifty-sixth street to Woodlawn, $1,600,000; thence to North White Plains, $225,000; Hudson River division, $500,000.

The excavation will be finished probably in 1914. We shall be fortunate if the station proper is finished at the end of the present year. All of the contracts for construction were made stipulating the date of completion as May 1, 1912, but the contractors are far behind in their deliveries of materials.

No arrangements have as yet been concluded for connection between the Grand Central terminal's lower level and the subway in the adjacent street, in spite of four years of negotiation. The railways' physical end is being constructed and bricked up. The lower level is approximately 30 feet below the present subway and the upper level is about on the same grade as the subway. The excavation has been finished up to the wall of the subway for about 30 feet in Forty-second street near Vanderbilt avenue.

The loop for suburban service (lower level) can be put in operation in about one year. A loop is also planned for trains on the upper level. Besides the loops there are to be thirty stub ends on the upper level, and twenty on the lower level. As soon as the problem of avoiding crossing at grade where the Harlem and Hudson divisions diverge (Mott Haven) the New York Central plans the construction of a new station at 149th street, where connection can be made with the subway.—*G. W. Kittredge, Chief Engineer, before Public Service Commission.*

Hoosac Tunnel Disaster.

The clearing of the Hoosac Tunnel, following the collision and fire of February 20, had been carried out sufficiently by Saturday, February 24, so that the westbound track was passable at 9:30 p. m. on that day; and the eastbound track on February 28. Both freight and passenger trains were run through on Sunday, but at this writing passenger traffic is not fully restored.

In this collision, briefly reported in our last issue, page 350, an eastbound train ran into the rear of a preceding freight, and the four men in the front end of the electric locomotive of the passenger train were killed. The freight had been stopped with its rear end about 1,400 feet west of the east end of the tunnel. The wreck took fire from the stove in the caboose of the freight, and there followed a fierce fire which thwarted all attempts to subdue it for 48 hours. The combustible portions of the caboose and 17 freight cars were entirely consumed and much of the iron and steel work was melted. The steel housing of the electric motor was crushed in at the front end by the collision with the caboose, and all of the lighter superstructure and minor electrical parts in this end of the engine were destroyed by the fire. The forward pair of motors was badly damaged, but the rear motors were unharmed. The engine was probably damaged from 50 per cent. to 60 per cent. of its value.

The gneiss rock which forms the roof and sides of the tunnel was heated to such an extent that hundreds of tons of it broke and fell to the roadbed.

As before stated, the collision occurred about four and one-half miles from the westerly end of the tunnel; that is to say, the passenger train had to be backed that distance after the collision to get out of the tunnel. The engineman of the steam engine failed in his first attempt to move the train with the electric motor attached. He uncoupled his engine from the motor, then set his train back about 200 yards, and then uncoupled from it and tried to pull back the electric engine. This he was unable to do and after about half an hour he backed up as far as the central shaft, 2 miles. From this point, the train despatcher was was spoken to by telephone and, after assurance was received that the track was clear, the train was backed down to North Adams, two miles from the westerly end of the tunnel, reaching there at 6 p. m.

W. S. Murray, electrical engineer of the New Haven road, and the man who had charge of the equipment of the tunnel for electric traction, made an inspection of the wreck on the 22nd, and reached the conclusion that the men in the cab of the electric motor had not been killed by electricity. It is quite probable that a short circuit occured at the time of the collision, which would have the effect of promptly opening the circuit breakers, thus cutting off current. It is quite impossible that the men riding on the engine could have been killed by a short circuit, as the protection afforded by the metal cab of the motor is complete, and any falling wires would have opened the circuit breakers without injury to those within.

The first man to go through the tunnel after the wreck was J. T. Tyter, assistant superintendent of the Fitchburg division, who, followed by other officers and employees, went through on foot on the morning of the 22nd, climbing over hot rocks lying from four to seven feet deep on the westbound track. Beneath these piles of rocks in many places fire was still burning and the explorers were obliged to protect their faces with wet cloths. All the time additional pieces of rock were falling from the roof, so that the men got through only by taking their lives in their hands. The mass of hot rocks lying on the track extended for a length of 900 feet and this mass, as well as the sides of the tunnel, was still very hot.

Relieving Anxious Passengers.

The following order has been issued by the Long Island Railroad to station agents and employees in train service. Comments will be found in our editorial columns.

"In event of any delay to trains or interruption of traffic which may be important enough to affect the comfort and convenience of passengers, conductors will make every possible effort to find out the cause of the delay and its probable extent and will furthermore see that a suitable announcement is made to passengers and others interested. Conductors and trainmen are instructed to freely and courteously answer all questions addressed to them upon this subject and give any and all information which may be necessary for passengers to make suitable arrangements. It may not always be possible for conductors and trainmen to find out exactly the cause of the trouble or the extent of the delay. In such instances they will only be expected to do the best they can. The chief train despatcher at Long Island City will endeavor to get in touch with the situation and will aid the efforts of conductors by giving them proper information, which in turn should be given to passengers. Station agents will endeavor to find out why trains are late and see that passengers waiting at the stations are properly advised. The despatcher's office will

also try to get in touch with the agents and assist them in ascertaining the cause and extent of trouble.

"This company feels that its patrons should be informed of any interruption of traffic or extraordinary delays to trains upon which they may be traveling or about to travel. In many instances information of this character is of great value to our patrons and frequently will enable them to change their arrangements and lessen the inconvenience to which they would otherwise be subjected. Nothing will produce so good an effect and contribute as much to the popularity of the Long Island Railroad as the announcement of information of this character."

Earnings Reckoned by the Day.

The French railway companies have a habit of stating their earnings per kilometer *per day,* which gives figures easily remembered and compared. In 1911, for instance, the old state system earned daily 60 francs per kilometer ($18,60 per mile); the new state system 105 francs ($33.60 per mile); the Northern Railway, which has the heaviest traffic, 218 francs ($67.60 per mile). All but one had slightly greater earnings than in 1910.

Master Car and Locomotive Painters' Association.

The advisory and executive committee of the Master Car and Locomotive Painters' Association held its annual meeting in New York, February 22, and decided on the following subjects for consideration at the next convention, which is to be held at the Albany hotel, Denver, Col., September 10-13:

What Is the Most Appropriate Finish for the Interior of Vestibule Ends? Specification for Standard Paint Materials for Railway Equipment. Treatment and Care of Steel Passenger Car Roofs. Modern Method of Exterior Passenger Car Painting, Including Primers and Surfacers. Relative Difference in Cost of Maintenance Between Steel and Wooden Passenger Cars. The following subjects for essays were chosen: Qualifications of The Present Day Foreman Painter, and Finish and Treatment of Passenger Car Concrete Floors. The following queries were also decided upon: What Is The Most Economical Process for Removing Old Paint from Locomotive Jackets? Would You Advise The Use of Interior Car Renovators and Why? What Are The Essentials of a Protective Paint Making Material? When Naturally Finished Ash, Oak or Mahogany Have Become Stained or Discolored by Exposure to Water or The Weather Can The Stains Be Permanently Bleached or Removed Without Scraping the Wood and How Should It Be Done to Obtain The Best Results. Would You Advise Painting a Wooden Roof of a Freight Car, Considering Its Treatment After Going Into Service?

American Society for Testing Materials.

At the convention of the American Society for Testing Materials, to be held in New York, March 28-29, reports will be received from the following committees among others:

Committee on the Magnetic Testing of Iron and Steel, by Charles W. Burrows, chairman. Committee on the Tempering and Testing of Steel Springs and Standard Specifications for Spring Steel, by Henry Souther, chairman. Committee on Hardness Tests, by Bradley Stoughton, chairman. Committee on Standard Specifications for Coal, by J. A. Holmes, chairman. Committee on Standard Specifications for Steel, by William R. Webster, chairman. Committee on Standard Specifications for Wrought Iron, by S. V. Hunnings, chairman. Committee on Standard Specifications for Cast Iron and Finished Castings, by Walter Wood, chairman. Committee on Standard Specifications for Cement, by George F. Swain, chairman. Committee on Standard Tests for Lubricants, by A. H. Gill, chairman. Committee on Standard Methods of Testing, by Gaetano Lanza, chairman.

American Railway Tool Foremen's Association.

The annual convention of the American Railway Tool Foremen's Association will be held at Chicago, beginning July 9. Following is a list of the committees and of the topics which will be discussed:

Standardization of Steel for Small Tools. Henry Otto (A. T. & S. F.), chairman; W. J. Eddy (Erie), A. M. Roberts (B. & L. E.), C. A. Cook (C. & I. L), J. Martin (C. C. C. & St. L.), and A. Sterner (C. R. I. & P.).

Milling Cutters, Their Formation, Tempering, Etc. A. R. Davis (Ga. Cent.), chairman; Gust Gstoettner (C. M. & St. P.), W. A. Fairbairn (N. Y. C. & H. R.), J. A. Shaw (Cent. of N. J.), F. W. Lugger (C. C. C. & St. L.), and A. W. Meitz (P. M.).

Care of Shop Tools. J. W. Pike (C. R. I. & P.), chairman; H. I. Derby (A. T. & S. F.), O. H. Dallman (Pennsylvania), Thos. Grant (D. & H.), E. R. Purchase (B. & A.), and G. L. Linck (H. & T. C.).

Checking Systems. J. T. Fuhrman (G. N.), chairman; J. B. Hasty (A. T. & S. F.), Wm. Greilich (C. H. & D.), H. E. Blackburn (Erie), Gilbert Mitchell (Erie) and F. Peterson (C. & S.).

Treating Steel in Electric Furnaces. G. W. Jack (I. C.), chairman; B. Hendrikson (C. & N. W.), J. C. Breckenfeld (St. L. & S. F.), and C. A. Shaffer (I. C.).

National Civic Federation.

The twelfth annual meeting of the National Civic Federation will be held at Washington, March 5, 6 and 7, the opening meeting being held at the Pan-American building, and those of the two other days at the Willard hotel. There will be a dinner on the evening of March 6, at which President Taft and Speaker Clark will be present. On the first day there will be an address by Judge Martin A. Knapp, on The Relation of The Public Utility Company to Its Employees, and it is expected that officers of railways and of railway brotherhoods will also speak. On the second day Workmen's Compensation and The Prevention of Industrial Accidents will be discussed, and Senator Sutherland will speak on Compensation for Injured Railway Employees.

American Electric Railway Association.

The annual convention of the American Electric Railway Association will be held in Chicago, October 7-11. The Dexter pavilion has been secured for the exhibit of the Manufacturers' Association.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

American Association of General Passenger and Ticket Agents.—W. C. Hope, New York; next convention, Seattle, Wash.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Detroit, Mich.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

American Electric Railway Manufacturers' Assoc.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York. Next session, May 15, New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

American Railway Engineering Association.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

American Railway Master Mechanics' Assoc.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

American Railway Tool Foremen's Association.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn. Convention, July 9, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual, March 28-29, New York.

American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

Association of Railway Claim Agents.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

Association of Transportation and Car Accounting Officers.—G. P. Conrad, 75 Church St., New York. Convention, Oct. 7-11, Chicago.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago. Convention, May 22-25, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Convention, September 10-13, Denver, Col.

NATIONAL RAILWAY APPLIANCES ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Next meeting, March 18, Chicago.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. Y., Sterling; September, 1912, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Wells-Fargo Express Company, which runs two solid express trains daily from New York to Chicago, and one from Chicago to Kansas City, is preparing to run a similar train from Kansas City to the Pacific coast over the Atchison, Topeka & Santa Fe.

The annual "family meeting" of freight and passenger agents of the Erie was held at the Great Northern hotel, Chicago, on February 24, with about 80 in attendance. Addresses were made by J. C. Stuart, vice-president and general manager; F. A. Clark, general auditor; E. T. Campbell, traffic manager, and Luis Jackson, industrial commissioner.

Shippers of Spokane, Wash., have filed with the Interstate Commerce Commission claims against the western railways for reparation amounting to approximately $2,000,000 on shipments moving during the years 1910 and 1911. Reparation is asked of the difference between the rates charged and those held to be reasonable in the latest decisions of the Interstate Commerce Commission in the transcontinental rate cases.

The Baltimore Chamber of Commerce and the Baltimore Clearing House, acting jointly, are establishing in that city a clearance bureau for bills of lading, to be under the direction of Mr. Sheridan, traffic manager of the Chamber of Commerce. This bureau, designed to accommodate shippers of all classes, is modeled after that established some months since in New York City for keeping records of bills of lading issued for export cotton.

The car service agent of the Grand Trunk Pacific says that there is no car shortage on this company's western lines. He says that the trouble is with the farmers, who are unable to thresh, and that the Grand Trunk Pacific can handle grain as fast as it is delivered to them. To bear out his statement he quotes despatches from various shipping points in Alberta and Saskatchewan, all of which say that the agents are handling all the grain that is delivered to them and that there is no shortage of cars.

A temporary organization, to be known as the Classification Committee, was effected at a meeting of representatives of state railway commissions and shippers' associations at St. Louis on February 20, for the purpose of prosecuting before the Interstate Commerce Commission the fight against the adoption of Western Classification No. 51 which has been suspended by the commission. Clifford Thorne, of the Iowa commission, who was elected chairman of the committee, in explanation of the purpose of the organization, took the position that while there is a well founded and just demand for uniformity in the descriptions of articles, it is practicable to secure a national uniform classification so far as descriptions of articles are concerned without lowering or raising freight rates.

Traffic Club of Chicago.

Nearly 600 members and guests attended the fifth annual dinner of the Traffic Club of Chicago, held on January 20, at the LaSalle Hotel, which was considered the most successful in the history of the club. John Barton Payne acted as toastmaster, and the speakers were Chief Justice Orrin N. Carter of the supreme court of Illinois, Dr. William McElveen of the Evanston Congregational Church, and James A. Green, president of the Matthew Addy Company of Cincinnati. President Taft, who is an honorary member of the Traffic Club will be its guest on March 9.

The annual meeting of the Traffic Club of Chicago for the election of officers for the ensuing year will be held on March 26. The nominating committee has nominated the following as members of the regular ticket: President, Frank B. Montgomery, traffic manager International Harvester Company; first vice-president, Edward S. Keeley, vice-president Chicago, Milwaukee & St. Paul; second vice-president, J. W. Hicks, traffic manager Sears, Roebuck & Company; third vice-president, Fred H. Tristram, assistant general passenger agent Wabash; secretary, Guy S. McCabe, general western freight agent Pennsylvania Company; treasurer, Charles B. Hopper, general freight

agent Goodrich Transportation Company. An active campaign is being conducted within the club to bring about the re-election of John H. Grace, assistant general freight agent of the Great Northern, to the office of treasurer of the club, which he has held ever since its organization.

Hearing on Express Business.

The Interstate Commerce Commission with Commissioner Lane presiding continued at Washington this week its hearings in the investigation into the business and practices of the express companies. Mr. Lane told the lawyers and the representatives of the companies that "the demand for transportation charges on prepaid shipments must cease. The complaint of this practice of express companies is universal, and a remedy for it must be found." Walker D. Hines, acting as special counsel for several of the express companies, presented a large mass of statistical matter relating to the business and profits of the American Express Company. He said, in part: "The total of all dividends disbursed to shareholders in a period of over forty-two years is less than $43,500,000. The gross receipts from the company's transportation business have grown from a little over $5,000,000 per year to about $40,000,000 per year. In other words, the business has increased more than seven-fold, but at the same time the company's annual profits from its transportation business are less than four times what they were at the beginning of the period. The ratio of operating expenses to revenue until and including 1888 averaged 78.46 per cent.; since 1888 the ratio has averaged 89.08 per cent.

"Until and including 1888 out of every dollar taken in for transportation service the company retained a profit averaging 12.86 cents; but since 1888 this profit, per dollar taken in, has dwindled to an average of 6.17 cents, and in 1911 this profit, per dollar taken in, was 5.80 cents."

Commissioner Lane desired to know why the express companies changed their forms of contracts with the railways from the tonnage contract, under which the railways were paid for the tons hauled for the express companies, to the present form of contract, whereby the railways are made partners by dividing the receipts. Mr. Bradley, of the American Express Company, said that in the old days the express companies carried practically nothing but merchandise and produce, and it was much easier to make the tonnage contract, but today, when the express companies carry nearly any and all things, a tonnage contract would not be elastic enough to meet the requirements. In the old days the express companies did not try very hard to get the 100-pound business, because with the larger shipment the rates were less, and this approached too near the rate the company had to pay the railway, and consequently the diminution of their margin of return. Under the percentage contract this does not enter as a consideration.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 113, giving a summary of car shortages and surpluses by groups from October 12, 1910, to February 14, 1912, says:

"The total surplus reported for this period is 50,886 cars, a decrease of 4,706 cars. The box car surplus shows a decrease of 1,355 cars and the coal car surplus decreased 2,578 cars. Flat and miscellaneous cars remained about stationary.

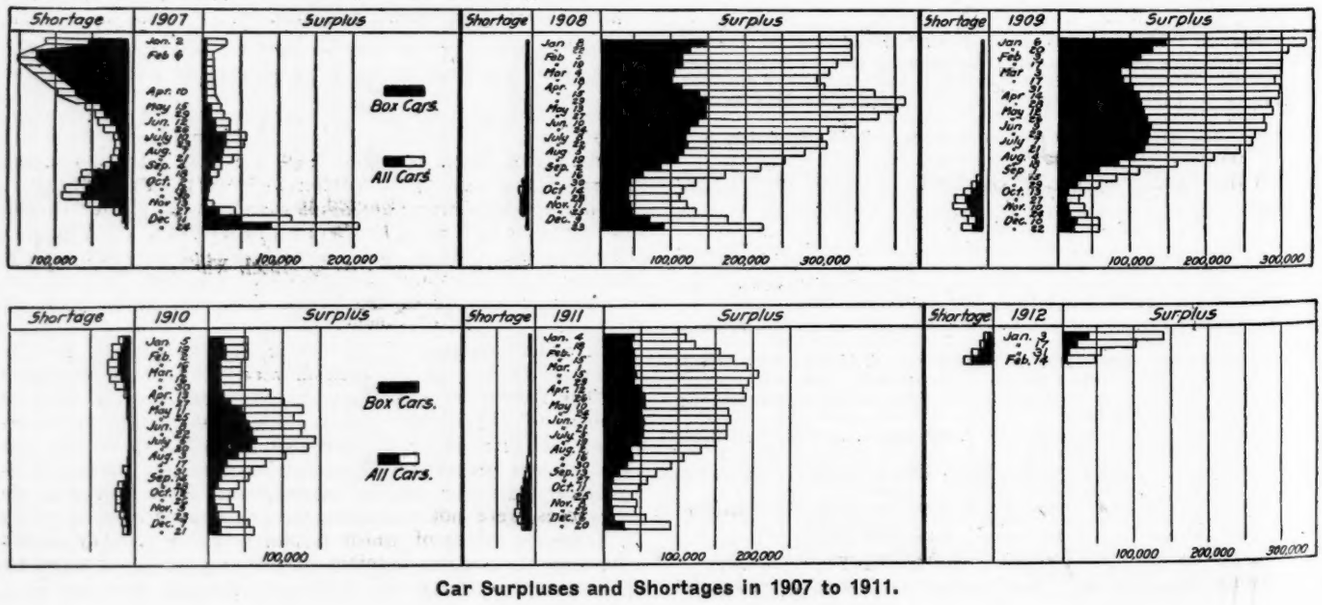
"The increased demand for box cars is shown by an increase of 9,052 cars in the box car shortage. The same can be said about coal cars, which show an increased shortage of 3,066 cars. Flat and miscellaneous car shortages increased 269 and 1,530 cars respectively, making a total increase of 13,917 cars in the car shortage, which brings the total shortage up to 36,928 cars."

The accompanying table gives car surplus and shortages figures

Car Surpluses and Shortages.

Date.	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—February 14, 1912	7	48	1,717	562	113	2,440	1,151	0	260	20	1,431
" 2.— " 14, 1912	26	771	140	1,256	876	3,043	514	1	1,534	325	2,374
" 3.— " 14, 1912	25	273	1,031	1,904	1,873	5,081	4,502	25	3,144	591	8,262
" 4.— " 14, 1912	11	11	78	458	720	1,267	957	226	2,895	500	4,578
" 5.— " 14, 1912	19	209	115	0	497	821	2,901	21	424	340	3,686
" 6.— " 14, 1912	24	1,289	478	2,124	3,204	7,095	5,373	329	306	139	6,147
" 7.— " 14, 1912	3	0	99	396	329	824	514	0	0	0	514
" 8.— " 14, 1912	17	945	289	1,554	1,872	4,660	1,142	65	26	20	1,253
" 9.— " 14, 1912	11	3,521	135	541	925	5,122	300	32	15	12	359
" 10.— " 14, 1912	20	4,051	3,383	2,669	9,288	19,391	160	0	0	18	178
" 11.— " 14, 1912	5	308	331	0	503	1,142	6,580	108	0	1,458	8,146
Total	168	11,426	7,796	11,464	20,200	50,886	24,094	807	8,604	3,423	36,928

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1911.

by groups for the last period covered in the report, and the diagrams show total bi-weekly surpluses and shortages in 1907 to 1911.

INTERSTATE COMMERCE COMMISSION.

The Calmbach-Ford Company, Shreveport, La., has complained to the commission against the present rates on corn and corn prolucts from Kansas City to Shreveport, and asks that a differential be granted to Shreveport.

The commission has begun its hearings on the complaint of the Postal Telegraph Company against the practice of the Western Union in charging for certain extra words on messages accepted by the Postal for points on the Western Union which are not reached by the Postal. The New York Public Service Commission, Second district, held a hearing on this practice in New York state and issued an order in regard to it, as noted in the *Railway Age Gazette* of November 17, 1911, page 1025.

A complaint has been filed with the Interstate Commerce Commission by ten sand and gravel companies of Chicago through Walter E. McCornack, attorney, attacking as unreasonable a proposed advance in the rates on sand and gravel from the gravel pits of the complainants to Chicago from 1½ to 2 cents per 100 lbs., effective March 15. The complaint alleges that the advance in rates would amount to about $240,000 annually and also attacks the existing rates as unreasonable in so far as they exceed one cent per 100 lbs.

The Board of Trade of Wichita, Kan., has filed two complaints with the Interstate Commerce Commission against the Atchison, Topeka & Santa Fe and other western lines. The first attacks alleged unreasonable rates on grain and grain products from Kansas producing territory to Texas points as being discriminatory against grain dealers and producers in the state of Kansas. The second charges that the rules of the carriers governing transit privileges on grain and grain products at Wichita contain restrictions and conditions which are unreasonable and discriminate against grain dealers at Wichita in favor of dealers at Kansas City, St. Louis and Omaha, who are granted proportional rates and reshipping rates.

Reparation Awarded.

Lord & Bushnell Co. v. Mississippi Central et al. Opinion by the commission:

Without specific routing instructions, a railway should always route a shipment by the cheapest available route. (22 I. C. C., 463.)

J. K. Gill Co. et al. v. Oregon Railroad & Navigation et al. Opinion by the commission:

The complaint is as to the charge of $3 per 100 lbs. on manila paper filing folders and as to the charge on certain shipments of adding machine paper. While the commission does not uphold the complainant in its claim that manila paper filing folders are the same as manila tag board, which is given the rate of $1.10 per 100 lbs., it holds that the difference between $1.10 and $3 is unreasonable and that the rate should have been $1.75 per 100 lbs. It is on this basis that reparation is awarded on both the manila paper shipments and the adding machine paper shipments. (22 I. C. C., 442.)

Advances in Class Rates Refused.

In re Suspension of Advances in Class Rates. Opinion by Commissioner McChord:

Proposed increased class rates from St. Paul, Minn., and Duluth to Buffalo, Pittsburgh, and other points in central freight association territory, not shown to be reasonable. 21 I. C. C., 338.)

Refusal to Participate in a Tariff.

Edison Portland Cement Company v. Delaware, Lackawanna & Western et al. Opinion by the commission.

Again the commission holds that the railway publishing a tariff showing they can make delivery on the track of a road from which it had not previously obtained concurrence, and which road refuses to participate in the tariff, is liable for damages that may occur. (22 I. C. C., 382.)

Rates on Dressed Meat to New Orleans and Lake Charles.

Houston Packing Company v. Texas & New Orleans et al. Opinion by the commission.

The complaint is that rates on packing house products and fresh meats in carloads from Houston, Tex., to New Orleans, La., and Lake Charles, are too high as compared with the rates from Fort Worth, where Armour and Swift have packing house plants. The commission reduces the rate on packing house products to Lake Charles from 32 cents to 20 cents, and from 35 cents on fresh meats to 25 cents, but finds that the present rate of 36 cents on packing house products and 40 cents on fresh meat from Houston to New Orleans is reasonable. No reparation, however, is awarded. (22 I. C. C., 456.)

Rates on Steel from Mississippi River to Denver Reduced.

Vulcan Iron Works Co. v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:

The rate on iron and steel bars and plates is 63 cents from Mississippi river crossings to Denver, while the rate on steel bars, etc., from Mississippi river points to Salt Lake City is only 82 per cent. of this 63-cent rate. The commission reduces the rate to Denver to 52 cents on iron and steel bars, and 43 cents on steel plates, sheets, etc. (22 I. C. C., 477.)

Lower Rates on Grain and Hay Ordered.

Chattanooga Feed Co. v. Alabama Great Southern. Opinion by the commission:

Rates on grain and hay from Chattanooga, Tenn., to points in Alabama are found to be unreasonably high, preventing Chattanooga dealers from competing in this territory. (22 I. C. C., 480.)

No Retroactive Transit Privileges.

Wood-Mosaic Flooring & Lumber Co. v. Louisville & Nashville. Opinion by the commission:

Although the defendant had made an agreement to refund a certain amount on proof of reshipment of manufactured products over its lines, the reshipment took place more than two years after the inbound shipments, and the commission, therefore, refuses to authorize an application of transit privilege because the intervening period was unreasonably long. (22 I. C. C., 458.)

Higher Rates on Iron and Steel Refused.

In re suspension of advances in rates on iron and steel articles. Opinion by Commissioner Lane:

The defendants presented one witness who frankly said that he did not presume to defend the case entirely. No briefs were filed, and the commission finds that the railways have not sustained the burden of proof placed on them. (22 I. C. C., 486.)

Burden of Proof in Coal Rate Advance Sustained.

Elmore-Benjamine Coal Co. v. Cleveland, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Meyer:

Both the Illinois railway commission and the Interstate Commerce Commission permitted certain rates on coal to be increased by seven cents a ton. This was in 1910. In 1911 the road, in checking tariffs found that the rate from Williamson and Franklin counties was three cents a ton higher than from Salina county, and equalized its rates by advancing the Salina county rate by three cents. These advances were suspended by the commission. The complainant tried to prove that both the advanced rate which the commission had permitted and the advanced rate which the commission had suspended were unreasonable, but the commission finds that these advances were not unreasonable, and that in the second case the burden of proof which is placed on the railway company has been sustained; therefore, the suspension of advanced rates is dismissed. (22 I. C C., 341.)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF DECEMBER, 1911.

Name of road.	Mileage operated at end of period.	Operating revenues: Freight.	Passenger.	Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Ann Arbor	291	$125,322	$48,035	$183,609	$15,492	$20,878	$4,978	$68,152	$9,995	$119,495	$64,114	—$3,844	$13,986	$46,284	$8,181
Atlanta & West Point	92	56,491	43,657	110,875	10,716	20,705	4,486	33,971	5,209	75,087	35,788	—817	5,189	29,782	—7,471
Atlantic & St. Lawrence	166	114,104	24,146	149,383	19,976	29,634	5,033	76,046	4,916	135,605	13,778	.....	6,659	7,119	—5,380
Belt Ry. Co. of Chicago	21	.....	.....	226,453	11,945	22,760	625	86,674	6,352	128,356	98,097	.....	5,500	92,597	28,761
Butte, Anaconda & Pacific	46	83,958	5,996	95,516	7,003	14,414	638	43,206	3,997	69,258	26,258	.....	2,914	23,344	16,690
Central of Georgia	1,915	784,756	369,657	1,275,863	153,408	211,855	33,424	422,053	37,198	857,938	417,925	5,045	63,284	359,686	—63,027
Central Vermont	411	219,437	76,390	322,608	26,534	53,131	7,349	166,881	13,021	266,916	55,692	123	12,200	43,615	—9,633
Chicago & Erie	269	332,223	62,956	441,877	45,819	79,600	19,918	230,131	12,193	387,661	54,216	.....	16,450	37,766	—30,770
Chicago, Indianapolis & Louisville	616	299,908	138,116	488,955	68,116	76,302	18,197	206,796	15,548	384,959	103,996	.....	23,414	80,582	—11,549
Detroit & Mackinac	358	62,890	27,103	96,007	15,639	18,973	2,019	32,189	2,998	71,818	24,189	—106	10,582	13,501	—1,175
Detroit, Grand Haven & Milwaukee	190	124,660	50,860	203,601	26,179	25,446	6,923	117,244	5,107	180,899	22,702	—87	2,880	19,735	—22,855
Duluth, Missabe & Northern	341	63,242	36,323	105,345	126,851	44,110	1,583	73,880	25,079	271,503	—166,158	—667	39,491	—206,316	—106,480
Erie	1,995	2,854,311	739,387	3,903,416	391,008	641,850	82,660	1,431,739	89,392	2,636,649	1,266,767	—57,885	163,026	1,045,856	—122,736
Florida East Coast	583	181,267	127,230	348,668	48,085	40,977	13,138	113,775	9,760	225,735	122,933	.....	15,500	107,433	—15,899
Galveston, Harrisburg & San Antonio	1,338	593,071	250,828	891,025	105,637	177,185	41,264	370,713	31,135	725,934	165,091	—6,437	108,886	49,768	—240,836
Grand Trunk Western	347	369,945	186,177	588,909	—18,913	67,294	20,006	244,102	15,465	327,954	260,955	—1,372	31,636	227,947	18,653
International & Great Northern	1,159	734,917	225,176	1,020,492	87,707	107,234	23,854	373,162	33,279	624,236	396,256	—688	33,000	362,568	.....
Kansas City, Mexico & Orient	809	112,984	31,378	153,866	41,912	32,153	5,505	74,219	9,162	162,951	—9,085	.....	2,698	—11,783	—32,374
Midland Valley	373	84,281	44,658	136,552	25,210	18,532	2,727	41,797	6,693	94,959	41,593	127	5,485	36,235	—6,065
Minneapolis, St. Paul & S. Ste. Marie	3,769	1,476,474	444,809	2,042,385	176,290	260,186	49,411	716,375	40,357	1,242,619	799,766	—840	115,690	683,236	352,643
New Orleans, Mobile & Chicago	404	135,193	34,539	178,571	23,599	18,042	2,721	53,804	8,619	106,785	71,786	—83	4,869	66,834	—7,084
New Orleans, Texas & Pacific	277	98,788	19,518	126,848	20,763	12,381	4,400	63,563	9,160	110,267	16,581	.....	+2,733	19,314	—9,939
Northwestern Pacific	416	98,981	126,942	246,026	44,988	42,029	2,822	103,240	9,840	202,919	43,107	.....	11,077	32,030	28,137
Pittsburg, Shawmut & Northern	240	105,539	9,228	116,835	10,830	23,473	1,197	34,586	4,657	74,743	42,092	.....	1,557	40,535	21,920
St. Louis & San Francisco	4,731	2,215,548	1,003,702	3,455,061	436,377	383,238	100,233	1,253,597	108,308	2,281,753	1,173,308	.....	157,338	1,015,970	76,441
San Antonio & Aransas Pass	727	254,531	101,220	377,541	49,253	44,801	6,140	151,886	9,942	262,022	115,519	.....	11,000	104,519	29,138
Seaboard Air Line	3,053	1,295,276	492,410	1,992,462	265,035	259,830	64,071	727,311	61,027	1,377,274	615,188	1,233	75,000	541,421	—61,965
Southern Pacific Co	6,195	4,450,223	2,519,223	7,494,681	803,283	1,107,382	169,595	2,335,213	187,756	4,603,229	2,891,452	84,799	383,808	2,592,443	—170,972
Spokane, Portland & Seattle	550	238,127	131,565	407,994	33,522	31,850	6,266	97,022	11,828	180,488	227,506	188	32,200	195,494	84,398
Sunset	58	45,013	15,490	65,000	27,949	11,417	15	77,408	21,106	137,895	—72,895	.....	3,390	—76,285	—122,871
Texas & New Orleans	458	207,458	93,815	319,747	50,103	77,252	10,145	139,134	12,959	289,593	30,154	—344	29,471	339	—41,577
Virginia & Southwestern	240	117,983	15,257	136,495	20,752	30,636	1,653	49,031	3,605	105,677	30,818	.....	4,710	26,108	—1,527
Wabash	2,514	1,637,907	596,761	2,426,263	232,392	432,882	87,236	1,105,632	85,209	1,943,351	482,912	—2,691	71,655	408,566	—99,846
Western Maryland	543	476,175	67,662	568,225	54,565	74,684	9,198	212,628	11,811	362,886	205,339	—1,134	21,000	183,205	36,732
Western Ry. of Alabama	133	69,732	47,399	127,212	17,356	21,405	4,897	33,792	5,625	83,075	44,137	998	4,612	40,523	2,327

SIX MONTHS OF FISCAL YEAR, 1912.

Ann Arbor	291	$730,954	$315,982	$1,116,691	$127,597	$111,324	$27,049	$376,432	$47,533	$689,935	$426,756	$2,445	$83,913	$345,288	$68,450
Atlanta & West Point	92	338,303	253,100	651,298	75,604	124,771	29,007	192,807	29,523	451,712	199,586	71	31,135	168,522	—1,174
Atlantic & St. Lawrence	166	491,092	174,715	732,589	222,124	133,413	25,730	317,594	19,677	718,538	14,051	.....	39,952	—25,901	—4,644
Belt Ry. of Chicago	21	.....	.....	1,355,855	87,283	150,647	3,817	483,655	36,515	761,917	593,938	.....	33,000	560,938	37,541
Butte, Anaconda & Pacific	46	457,349	58,425	551,800	63,512	104,080	4,106	242,411	17,393	431,502	120,298	.....	13,765	106,533	—22,217
Central of Georgia	1,915	4,578,402	2,050,141	7,278,473	865,655	1,304,603	205,128	2,325,830	229,670	4,930,886	2,347,587	35,814	295,964	2,087,437	71,538
Central Vermont	411	1,349,129	629,691	2,145,251	257,534	317,104	47,646	953,208	56,075	1,631,567	513,684	3,903	72,300	445,287	—12,373
Chicago & Erie	269	2,121,448	384,571	2,752,080	428,149	491,277	124,267	1,236,530	63,500	2,343,723	408,357	.....	93,188	315,169	—91,413
Chicago, Indianapolis & Louisville	616[1]	2,177,298	891,998	3,374,760	452,854	460,251	108,053	1,172,290	87,606	2,281,054	1,093,706	.....	140,511	953,195	31,823
Detroit & Mackinac	358[2]	390,680	188,783	618,023	111,607	103,753	14,360	193,117	18,289	441,126	176,897	1,556	51,956	126,497	—42,605
Detroit, Grand Haven & Milwaukee	190	701,406	366,528	1,227,606	145,885	153,445	42,345	573,827	27,086	942,588	285,018	—364	17,279	267,375	65,682
Duluth, Missabe & Northern	341[3]	4,316,172	235,083	4,607,732	656,188	404,663	11,760	764,254	86,968	1,923,833	2,683,899	36,685	225,451	2,495,133	—2,644,826
Erie	1,995	18,968,999	4,900,099	25,740,820	3,084,888	4,186,707	561,559	8,292,702	522,559	16,648,415	9,092,405	17,867	901,546	8,208,726	68,721
Florida East Coast	583	837,707	534,046	1,569,962	329,375	282,847	36,275	586,405	52,808	1,287,710	282,252	—303	93,000	188,949	—29,741
Galveston, Harrisburg & San Antonio	1,338	3,803,321	1,481,147	5,565,873	661,488	916,395	194,278	2,044,474	161,180	3,977,815	1,590,758	—29,125	261,096	1,300,537	—296,630
Grand Trunk Western	347	2,033,564	1,198,506	3,445,878	352,859	484,121	117,710	1,337,101	80,880	2,372,671	1,073,207	—4,685	189,811	878,711	212,368
International & Great Northern	1,159[4]	2,863,505	749,378	3,815,997	307,358	389,859	77,812	1,279,998	107,966	2,162,993	1,653,004	—1,357	115,000	1,536,647	.....
Kansas City, Mexico & Orient	809[5]	706,614	191,514	949,306	235,818	193,947	49,405	424,913	52,433	956,516	—7,210	.....	32,937	—40,147	94,426
Midland Valley	373[6]	502,063	234,225	782,771	163,360	124,947	18,502	241,392	37,489	585,690	197,081	653	32,906	164,828	—17,804
Minneapolis, St. Paul & S. Ste. Marie	3,769[7]	9,867,670	3,121,057	13,735,802	1,350,145	1,658,311	273,956	4,211,952	268,179	7,762,543	5,973,259	82,830	836,685	5,219,404	1,467,237
New Orleans, Mobile & Chicago	404	716,841	189,780	962,426	143,636	101,679	16,615	286,934	48,084	596,948	365,478	—204	27,666	337,608	—20,180
New Orleans, Texas & Pacific	277[8]	550,748	115,237	709,745	136,523	79,384	25,009	312,026	43,357	596,299	113,446	.....	3,473	109,973	1,097
Northwestern Pacific	416[9]	810,052	1,040,007	1,982,924	294,253	247,235	19,878	667,540	55,710	1,284,616	698,308	.....	73,212	625,096	88,886
Pittsburg, Shawmut & Northern	240	625,936	56,079	693,630	84,348	145,332	6,721	196,580	23,533	456,514	237,116	.....	9,472	227,644	100,117
St. Louis & San Francisco	4,731	13,389,401	6,017,513	20,886,946	2,666,689	2,669,067	536,994	7,111,373	593,533	13,577,656	7,309,290	.....	953,312	6,355,978	265,900
San Antonio & Aransas Pass	727	1,743,075	668,950	2,546,541	385,590	278,853	33,775	853,513	58,419	1,610,150	936,391	.....	66,000	870,391	59,827
Seaboard Air Line	3,053[10]	7,470,898	2,533,042	11,151,686	1,613,383	1,608,103	345,085	3,919,212	343,697	7,829,480	3,322,206	—5,059	447,000	2,870,147	—82,641
Southern Pacific Co	6,195[11]	28,319,650	16,170,718	47,703,137	5,437,319	5,484,792	1,029,417	13,269,111	1,175,151	26,395,790	21,307,347	245,462	1,927,672	19,625,137	—1,071,103
Spokane, Portland & Seattle	550[12]	1,504,392	946,930	2,609,923	252,742	224,852	43,038	632,821	65,679	1,219,132	1,390,791	9,119	233,200	1,166,710	82,689
Sunset	58[13]	394,713	98,492	514,532	70,078	20,339	305	195,383	22,537	308,642	205,890	.....	20,339	185,551	—114,254
Texas & New Orleans	458	1,309,912	537,773	1,965,196	329,838	429,665	46,896	756,501	59,814	1,622,714	342,482	—2,773	90,711	248,998	—91,895
Virginian & Southwestern	240	754,424	89,488	865,260	105,370	169,749	10,858	249,291	24,013	559,281	305,979	.....	28,261	277,718	82,712
Wabash	2,514[14]	10,123,769	3,984,382	15,282,521	1,863,166	2,524,749	497,538	5,952,142	460,434	11,298,029	3,984,492	—5,821	421,697	3,556,974	—822,577
Western Maryland	543	2,968,402	538,518	3,663,533	477,272	439,415	63,360	1,246,538	73,844	2,300,429	1,363,104	—343	126,000	1,236,761	—91,697
Western Ry. of Alabama	133	402,104	254,334	713,306	110,710	129,962	31,984	185,323	37,190	495,169	218,137	70	27,674	190,533	21,760

[1] Figures shown here are for the period September 16 to December 31, 1911.
Operated in previous year—[1] 615; [2] 360; [3] 293; [5] 740; [6] 323; [7] 3,572; [8] 264; [9] 376; [10] 3,028; [11] 6,187; [12] 432; [13] 56; [14] 242. — Indicates Deficits, Losses and Decreases.

No Reparation to Uninjured Complainant.

Lamb, McGregor & Co. v. Chicago & North Western et al. Opinion by the commission.

The complainant is a grain commission house which paid charges on a shipment of wheat and flaxseed, but which recharged the full amount of the freight rate to the shipper, A. N. Barber. Barber is not a party to the complaint. The commission finds that there actually was an overcharge made on the shipment, but since the complainant was not injured in any way by the overcharge, reparation cannot be made to him; and since Barber is not a party to the complaint, reparation cannot be made to him. The railway, however, should find out who is rightly entitled to the amount of the overcharge and refund the same to him without an order from the commission. (22 I. C. C., 346.)

Bond Required for Average Demurrage Privilege.

Washburn-Crosby Milling Co., Inc., v. Southern Railway. Opinion by the commission:

The average demurrage privilege is granted only to shippers who furnish a bond providing for sufficient security for the payment of their balance at the end of each month. The complainant objected to the terms of this bond, and during the negotiations demurrage was charged on a straight demurrage basis. The form of bond, it is found, was not objectionable to the complainant, but only to the surety company first applied to. The rule of the defendants is not considered unreasonable and the complaint is dismissed. (22 I. C. C., 465.)

Hardwood Lumber Rates Reduced from Territory East of the Mississippi.

Michigan Hardwood Manufacturers' Association v. Transcontinental Freight Bureau et al. Opinion by Commissioner Prouty.

In the so-called Burgess case, 13 I. C. C., 668, the commission reduced the blanket rate on hardwood lumber from 85 cents to 75 cents from Chicago territory and from Mississippi river points to the Pacific coast, but refused to reduce the 85-cent rate from points east. The complainants are situated on the extreme western edge of the territory to which the 85-cent rate applies and are in sharp competition with nearby mills to which the 75-cent rate applies. The commission reduces the 85-cent rate from Michigan territory to 80 cents, but leaves the exact line where the 85-cent rate shall end and the 80 begin to be discussed later. (22 I. C. C., 387.)

Six Days Only, Given for Furnishing Special Equipment.

William K. Noble v. Baltimore & Ohio et al. Opinion by Commissioner Prouty.

A lumber merchant ordered a 33-ft. car from the Baltimore & Ohio, but after waiting six days, shipped 20,100 lbs. in a 36-ft. car. The minimum for C. L. rate in the longer car was 30,000 lbs., and for the shorter car, 24,000 lbs. The B. & O. charged the shipper for 30,000 lbs. The commission finds that since a competitor of this merchant might have been furnished a car with a minimum of 24,000 lbs., and thus obtained a discrimination over the shipper who got the larger car, such a discrimination ought not to be possible under the tariff of a railway. The commission recognizes that it is proper for the railway to make rules which shall help to utilize its smaller cars, but believes that all the hardships of such rules should be borne by the railway companies and not by the shippers. The commission finds, however, that shippers desiring to use equipment of an unusual size may fairly be required to give considerable notice to the railway. The commission thinks that any time longer, however, than six days' notice would be unreasonable. (22 I. C. C., 432.)

Division of Rate on Material for Company Use.

Switzer Lumber Co. v. Alabama & Mississippi Railroad et al. Opinion by Commissioner Meyer:

A shipment of ties was consigned to the Union Pacific, or to its storekeeper at Linwood, Kan., in care of the Union Pacific at Kansas City, Mo. The contract called for the lumber f. o. b. at Kansas City. The Union Pacific, on receiving the cars at Kansas City, did not ship them on to Linwood, but distributed them to points on its lines where the ties were to be used. The complainant claims that it should only have had to pay a freight charge equal to the division formed by the haul to Kansas City of the through rate from point of origin to Linwood, Kan. By the Union Pacific's action, however, it was compelled to pay the rate from point of origin to Kansas City, which was somewhat higher than the division of the through rate. The commission finds that the rate imposed was proper. The commission, of course, does not inquire into what right of action the complainant may have against the Union Pacific in the courts for breach of contract. (22 I. C. C., 471.)

Rates Reduced to Permit of Competition.

International Agricultural Corporation v. Louisville & Nashville et al. Opinion by Commissioner Prouty:

The complainant manufactures and sells fertilizer throughout the South and uses in the manufacture of this commodity large quantities of sulphuric acid, which it gets at Copper Hill, Tenn., a station on the L. & N. Sulphuric acid is manufactured from pyrites. The cost of sulphuric acid to the complainant at any point is the price at Copper Hill plus the freight from Copper Hill. The competitors of the complainant ship pyrites to the sea coast and there manufacture the sulphuric acid. The cost of sulphuric acid to the competitors is, therefore, the cost of manufacturing at the sea coast plus the rate on pyrites to the sea coast. The complainant insists that rates on pyrites and on sulphuric acid should be made to correspond, while the defendants claim that the pyrites rate is unduly low because of other conditions. The commission does not think that the rate on sulphuric acid and on fertilizer should be the same, the value of sulphuric acid being $5 per ton and the fertilizer from $15 to $20 per ton. The complainant asks that the present rates be reduced on a scale suggested by a reduction from Copper Hill to Augusta, Ga., from $3 per ton to $2.25 per ton. The commission reduces these rates, with one or two exceptions, on a scale suggested by a reduction from $3 per ton from Copper Hill to Augusta to $2.80 per ton. (22 I. C. C., 488.)

Grain Elevation Charges Passed Upon.

Traffic Bureau, Merchants' Exchange of St. Louis v. Chicago, Burlington & Quincy et al. Opinion by Commissioner Prouty:

In 14 I. C. C., 317 the commission fully discusses the facts in regard to a payment of an elevation allowance of three-fourths of a cent per 100 lbs. at the Missouri river, and no payment for elevation at points on the Mississippi river. In this case it was held that such an allowance was a discrimination against grain dealers in St. Louis. The Supreme Court held the commission's order prohibiting the payment of allowances altogether to be unlawful. In the Peavey cases the commission held that whatever allowance was made for elevation to the Peavey company must be made by the Union Pacific to all competing elevators at Omaha, and this order of the commission has been sustained by the Supreme Court of the United States. Considering these two cases together as applied to the general subject of elevation and transfer in transit, the commission concludes that it was the intention of the Supreme Court to hold that whatever might be the case, if a railway saw fit to confine its payment to elevation actually required in the conduct of its business, it must, when it makes this allowance to one elevator under such circumstances as to give that elevator payment for commercial elevation, extend the same privilege to all other elevators similarly situated. In accordance with these decisions of the Supreme Court, the commission has issued new orders requiring the defendants not to exceed three-fourths of a cent per 100 lbs. in the payment of elevation allowance at the Missouri river, and to confine that payment to grain actually passing through the elevator in ten days. (22 I. C. C., 496.)

Trimming Coal a Part of Rail Transportation.

New England Coal & Coke Co. v. Norfolk & Western et al. Opinion by Commissioner McChord:

The complaint is by a company which buys and sells coal and runs a line of vessels from Norfolk, Newport News, etc., to

Boston to carry its coal. The complainant's coal is loaded into the vessels from the mechanically operated coal chutes of the various railway companies, and the complainant says that a charge of three cents at Maryland ports and 4.45 cents at Virginia ports for trimming the coal while it is being dumped into the hold of the vessel is unreasonable. The commission is asked to reduce these charges to ½ cent per ton, or to permit complainants to do their own trimming. The defendants claim that the transportation by rail of coal ends at the top of the pier and that the trimming of the coal in the vessel's hold is entirely a maritime service and not a part of the rail transportation service. The commission, however, finds that this service is an essential link in effecting delivery, because no complete and reasonable delivery can otherwise be accomplished. The defendants claim that only one firm of stevedores should be allowed to do this work, and the commission thinks that this is fair, but the fact is that vessels may carry their own trimmers if they so desire. Complainant, however, has never availed itself of this privilege.

The vessels operated by the complainant are of what are known as the self-trimming type, with mechanical devices which do a part of the labor of the trimmers. The commission finds that the charge of three cents per ton is not unreasonable, but that the charge by the Virginian Railway of 4.45 cents per ton is unreasonable and is ordered reduced to three cents per ton. Reparation is awarded. (22 I. C. C., 398.)

Discrimination in Rates on Cement.

Alpha Portland Cement Co. v. Baltimore & Ohio et al. Opinion by Commissioner Clements:

Manheim, W. Va., where the cement plant of the complainant is located, is 77 miles west of Cumberland, Md., and connected by the Morgantown & Kingwood Railway with both the St. Louis-Cumberland line of the Baltimore & Ohio and the Chicago-Cumberland line. The Universal Portland Cement Co., a competitor, in whose favor it is claimed there is discrimination, is situated at Universal, Pa., 150 miles north of Manheim and 16 miles east of Pittsburgh, and is within the switching limits of Pittsburgh. Theoretically, there is no difference in the basis of rates from Manheim and Universal on eastern shipments. As a matter of fact, however, Manheim rates are constructed on a western termini basis, although Manheim is 130 miles east of those termini, whereas the rates from Universal, which is nearly on the Buffalo-Pittsburgh line separating central freight association and trunk line territories, are based on acual distance. The cement rates in trunk line territory seem to be influenced by competition from the Lehigh district, which includes New Jersey and eastern Pennsylvania. In constructing rates to central freight association territory, Universal is considered a central freight association point and operates under the central freight association scale, while the rates from Manheim are constructed upon the basis of a certain percentage of the New York-Chicago rate. The commission finds that Manheim is subject to unjust discrimination which is wholly unwarranted on the theories advanced by the defendant or on the transportation conditons as brought out in this case. Lower rates are therefore prescribed to Manheim, placing it on a basis reasonably comparable to Universal. (22 I. C. C., 446.)

STATE COMMISSIONS.

The Maine commission has issued an order to all railway companies in the state, requiring detailed plans of new bridges and of alterations proposed in existing bridges to be submitted to the commission and receive approval before construction work is begun.

The New York State Public Service Commission, Second district, has dismissed the complaint of merchants of Phoenix against the New York Central for taking off two passenger trains. The commission found that the merchants were accommodated by an electric railway.

The California Commission recently called before it the engineers of the principal railways of the state to explain why they had not complied with the order of the commission to file plans of the railways' property, with estimates of its value. The engineer gave, as a reason, the magnitude of the work, and the commissioners suspended their inquiry for thirty days.

The Texas railway commission is reported to be making an investigation of an alleged combination of coastwise steamship lines operating between New York and other Atlantic ports and gulf ports, with a view to securing the co-operation of other state commissions in bringing about a thorough investigation by Congress of charges that the alleged combination has stifled competition and is maintaining excessive freight rates.

The Massachusetts commission, reporting by request to the legislature, recommends that season ticket rates on the railways of that state be made uniform for similar distances on all lines. There is at present a considerable diversity in these rates on different roads and on different parts of the same road, the tariffs having been established years ago when some of the divisions were independent roads. It is held that all season ticket rates should be made on a monthly basis. In the same report the commission rejects the proposition to prescribe by law a rate of two cents a mile for all single trip tickets; such a reduction would unreasonably reduce the income of the carriers.

The Illinois railway commission, after a hearing in Chicago on February 19 on complaints of coal operators against the Illinois Central's rules for car distribution, issued a temporary order, effective until April 1, requiring the road to distribute coal cars to mines on the basis of shipments during the previous month. The Illinois Central had adopted a rule providing for a distribution on the basis of the average shipment during the nine months previous to February 1. The commission will conduct an investigation of conditions governing the distribution of coal cars at mines in Illinois, Indiana, Kentucky and Ohio, with a view to establishing a uniform rule. The Interstate Commerce Commission and the railway commissions of the states named will be invited to participate.

The New York State Public Service Commission, Second District, has ordered the Lehigh & Hudson River to resume running passenger train No. 6. This is a train between Warwick and Greycourt, ten miles, which has been discontinued during the winter months for the past three seasons, this season being the fourth. The train will afford a second morning connection with the Erie, and the commission holds that it can be run "without incurring additional expense," as the same crew that makes the two round trips over this section can make a third (deadhead one way). At the hearing in Warwick, the road showed that this train averaged but eleven passengers a day during the fall season up to December 19, when it was discontinued for the winter; and that its earnings from July 1 to November 30 were but 38 cents per revenue train mile; and the crew had to make a deadhead movement of ten miles to run the train. It was also shown that the passenger earnings for this train were 35 per cent. less during November than during August, that the entire passenger earnings of the road for the three winter months as compared with the three summer months were less by 42 per cent., and that a reduction in train service was in accordance with the custom in localities where the population is greater in summer than in winter. The commission justified its order also on the ground that the population had increased materially during the past ten years, though the road showed that four-fifths of the increase in population was made up of its own employees and their families.

COURT NEWS.

The Adams Express Company was indicted on eleven counts by a federal grand jury at Cincinnati on February 22 for charging more than the published tariffs on express shipments.

The United States circuit court has postponed until April 12 its original order directing the dissolution of the National Lamp Company, a subsidiary of the General Electric Company, which was to have become effective January 12. (October 26, 1911, page 806.)

The Supreme Court of the United States, on Monday of this week, decided in favor of the Southern Pacific Railroad Company in its suit to establish its right to the so-called "main-line grant" of land along the Atlantic & Pacific. It is said that the de-

cision validates claims to land in California worth more than $1,000,000.

Suit was filed in the United States District court at Chicago on Monday by the Taylor Coal Company and the Security Coal & Mining Company, asking that the Illinois Central be enjoined from putting into effect an order of the Illinois railway commission providing for the distribution of coal cars to mines on the basis of the previous month's shipments. The bill alleged that the commission is exceeding its authority and is in effect attempting to regulate interstate commerce.

John E. Bernard, a forwarding agent recently indicted in the Federal Court at New York for falsely describing freight shipped from New York westward, pleaded guilty on February 20, and was fined $1,050, this being $150 on each of seven counts; but the prosecuting attorney declared that there was evidence of 65 offenses. In one case silk shawls were classified as cotton goods. According to the government the forwarding agent charged the owners of the goods the full tariff rates. Two other men were fined smaller sums.

In the Federal court at Syracuse, N. Y., the Delaware & Hudson Company has been indicted by the grand jury on 30 counts for alleged violation of the commodity clause of the Interstate Commerce act. The case is based on the allegation that the company transported hay to feed mules in its mines. The company was also indicted for the alleged billing of cars of rails from Albany to Syracuse, when, the prosecution claims the cars were shipped from Carbondale to Syracuse; and J. White Sprong, the company's purchasing agent, was indicted for directing the making of the alleged false bills. Mr. Sprong and Lewis E. Carr, who appeared for the company, entered pleas of not guilty and gave bail for appearance at the April term of the court in Syracuse.

The case in which the federal government is to try to prove that the Hocking Valley and five other railways and three coal companies are operating in violation of the Sherman anti-trust law was begun at Columbus, Ohio, February 27, before three judges of the United States circuit court of appeals. The government's contention is that in 1903 the Pennsylvania, Erie, New York Central & Hudson River, Baltimore & Ohio and Chesapeake & Ohio gained control of the Hocking Valley, and as a result established a monopoly in the transportation of coal from the Ohio, Pennsylvania and West Virginia coal fields, and that the coal properties of these roads were merged in the Sunday Creek Coal Company. The government will try to prove that a monopoly in restraint of trade has been maintained ever since 1899.

The United States Commerce Court, in the case of the Louisville & Nashville, has annulled the order of the Interstate Commerce Commission reducing through rates on freight from New Orleans to Montgomery, Selma and Prattsville, Ala. The court says: "There was no attempt to meet the case as made out for the company, either by way of argument or otherwise. Counsel for the commission and for the government simply rely on the authority of the commission to determine what is a reasonable rate, and the conclusiveness of its judgment where it has done so, against which it was argued that the courts can afford no relief unless the rate which has been fixed is shown to be confiscatory. But this contention, as presented and sought to be applied in the case at bar, must be rejected. In our judgment, it was never intended to confer on the commission any such unrestrained and undirected power. As already pointed out, the law provides for a hearing and it must be more than a shadow. Both parties are entitled to be confronted with the evidence on which the case is to be determined, and the conclusion reached must be a reasonable inference from the facts disclosed by the investigation." This decision will revive discussion on the contention which has been presented in many arguments that the findings of the commission on questions of fact are final. In this contention it is held that the power of naming a reasonable rate is purely legislative; that this function has been delegated to the commission by Congress and that the Commerce Court cannot pass on findings of fact except in cases where the rates are shown to be confiscatory. In substance the court now decides that the evidence before the commission in the case was not sufficient to justify the order. The decision will, of course be appealed by the government to the Supreme Court.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

G. G. Yeomans, assistant to the president of the Wabash, at Chicago, has resigned. Effective March 1.

George J. Schoeffel, formerly fire warden of the Erie at New York, has been appointed a special agent of the Erie, the New York, Susquehanna & Western, the New Jersey & New York and the Chicago & Erie, with office at New York.

N. T. Guernsey has been elected chairman of the board of the Denver, Laramie & Northwestern; F. A. Bridge has been elected second vice-president; Otto Huber has been appointed treasurer, and O. D. Berroth has been appointed secretary.

Milton S. Barger, assistant treasurer of the New York Central & Hudson River, at New York, has been appointed treasurer of the Lake Shore & Michigan Southern and other New York Central Lines west of Buffalo, N. Y., with office at New York, succeeding C. F. Cox, deceased. George W. Porter, paymaster at New York, succeeds Mr. Barger.

Through an error in our issue of last week it was made to appear that J. W. Newlean, general auditor of the Illinois Central, had been appointed comptroller of that company. Mr. Newlean has resigned as general auditor of the Illinois Central to become comptroller of Wells, Fargo & Co., with office at Chicago, effective March 7, succeeding E. E. Honn, general auditor, who has been transferred to the operating department.

Operating Officers.

J. M. Turner, general manager of the Georgia & Florida, at Augusta, Ga., has resigned to go to a company that will build a new line in North Carolina.

E. C. Lilley, trainmaster of the Gulf, Colorado & Santa Fe at Cleburne, Tex., has been appointed train and station inspector of the St. Louis & San Francisco, with office at Springfield, Mo.

Addison H. Mars has been appointed assistant trainmaster of the Philadelphia Terminal division of the Pennsylvania Railroad, with office at Philadelphia, Pa., succeeding C. W. Valentine, retired.

Henry A. Williams, chief despatcher of the Erie Railroad at Hornell, N. Y., has been appointed trainmaster, with office at Hornell, succeeding A. Ruffer, transferred, and Edward H. Fahey succeeds Mr. Williams.

Fred S. James, formerly superintendent of the Missouri, Kansas & Texas of Texas at Greenville, Tex., has been appointed superintendent of the lines from Fort Worth to Granger, including Fort Worth yard, with office at Hillsboro, Tex.

W. Rudd, assistant superintendent of the St. Louis & San Francisco at Enid, Okla., has been appointed assistant superintendent, with headquarters at Newburg, Mo. As was announced in these columns last week, B. Casey succeeds Mr. Rudd.

E. H. Zeigler, trainmaster of terminals of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, Ind., has been appointed trainmaster, with office at Terre Haute, Ind., succeeding W. I. Lamport, resigned. E. F. Hayes, trainmaster of the south end of the Cairo division, at Harrisburg, Ill., has been appointed trainmaster of the west end of the St. Louis division, with office at Mattoon, Ill., succeeding G. M. French, granted leave of absence.

A merger having been effected of the Raleigh & Southport, the Sanford & Troy, the Durham & Charlotte, and the Aberdeen & Asheboro, with the Raleigh, Charlotte & Southern, the lines above referred to will be operated as follows: Raleigh & Southport, as the Raleigh & Southport division, with offices at Raleigh, N. C.; Sanford & Troy and Durham & Charlotte, as the Durham & Charlotte division, with offices at Aberdeen, N. C.; and the Aberdeen & Asheboro, as the Aberdeen & Asheboro division, with offices at Aberdeen, N. C. F. T. Ricks, secretary, treasurer and assistant general manager of the

Raleigh & Southport, has been appointed superintendent of the Raleigh & Southport division of the Raleigh, Charlotte & Southern, with office at Raleigh, N. C.

A change has been made in the operating organization of the Pullman Company by which, effective March 1, the four divisions designated as Northeastern, Southeastern, Northwestern and Southwestern, and the title of division superintendent have been abolished. Representatives at New York, Philadelphia, St. Louis, Houston and San Francisco will hereafter have the title of superintendent, and at the first three places mentioned the district organization has been merged into that of the superintendent. A. J. Grant, district superintendent at New York, has been appointed superintendent at New York; J. T. Ransom has been appointed superintendent, with office at Philadelphia; F. E. Cook, district superintendent at St. Louis, has been appointed superintendent, with office at St. Louis, D. H. Martyn, division superintendent at that place having retired; A. V. Burr, district superintendent at Houston, has been appointed superintendent at Houston; F. L. Wood, district superintendent at Denver, Colo., has been appointed superintendent, with office at San Francisco; J. C. Patterson, division superintendent at Chicago, has been appointed assistant to the general superintendent at Chicago; and P. L. Randall has been appointed assistant superintendent of car service at Chicago. J. L. Walker has been appointed superintendent of yards and stores, and the position of supervisor of cleaning is abolished. F. D. Chamberlin, district superintendent at Portland, Ore., has been transferred to Denver, Colo., succeeding Mr. Woods; and C. Lincoln, district superintendent at San Francisco, succeeds Mr. Chamberlin.

Traffic Officers.

J. C. Huertas has been appointed traveling freight agent of the Seaboard Air Line, with office at New York.

H. F. Bostwick has been appointed traveling passenger agent of the New York Central Lines, with headquarters at Oklahoma City, Okla.

C. L. Hanna has been appointed traveling freight and passenger agent of the Texas Central Railroad, in charge of territory from Gorman, Tex., west.

Philip E. McIntyre has been appointed freight solicitor in connection with the Los Angeles, Cal., agency of the Star Union Line of the Pennsylvania Lines West.

E. C. Tucker has been appointed soliciting freight agent of the Nashville, Chattanooga & St. Louis, with office at Jacksonville, Fla., succeeding W. R. Lovett, resigned.

J. A. Michaelson, traveling passenger agent of the Duluth, South Shore & Atlantic at Grand Rapids, Mich., has been appointed also traveling freight agent at that place.

Walter A. Smith has been appointed traveling freight agent of the Lake Erie & Western, the Fort Wayne, Cincinnati & Louisville and the Northern Ohio, with headquarters at Indianapolis, Ind., succeeding F. M. Martin, resigned.

J. W. McCann, chief rate clerk of the St. Louis & San Francisco at New Orleans, La., has been appointed traveling freight agent, with office at New Orleans, succeeding J. P. Fresenius, resigned to accept service with another company.

A. R. Brasted, commercial agent of the Rock Island Lines at Colorado Springs, Colo., has been appointed division freight agent, with headquarters at Wichita, Kan., succeeding E. B. Hooser, deceased. F. H. Faus succeeds Mr. Brasted.

N. F. Knight, soliciting freight agent of the Philadelphia & Gulf Steamship Company at New Orleans, La., has been appointed agent, with office at New Orleans, succeeding H. P. Dolard, resigned to accept service with another company.

T. B. Montgomery, general agent in the freight department of the Minneapolis, St. Paul & Sault Ste. Marie at Chicago, has been appointed general agent of the Chicago, Milwaukee & St. Paul, with office at Pittsburgh, Pa., succeeding J. C. Wood.

C. V. Gallagher, contracting freight agent of the Minneapolis, St. Paul & Sault Ste. Marie at Chicago, has been appointed general agent in the freight department, with office at Chicago, succeeding T. B. Montgomery, resigned to accept service with another company.

W. B. Durrett, traveling freight agent of the Missouri & North Arkansas at New Orleans, La., has been appointed traveling freight and passenger agent, with headquarters at Memphis, Tenn., and Fred Borgwald has been appointed soliciting freight agent, with office at New Orleans.

J. A. Brown, whose appointment as general freight agent of the New Orleans, Texas & Mexico, and the Beaumont, Sour Lake & Western, with office at Houston, Tex., was recently announced in these columns, has had his jurisdiction extended over the New Iberia & Northern.

R. R. Otis, general agent of the Mobile & Ohio at Atlanta, Ga., has resigned and his former position has been abolished. Charles Patton, traveling freight agent at Atlanta, has been appointed commercial agent, with office at Atlanta. C. O. Ruden, soliciting freight agent at Atlanta, succeeds Mr. Patton, and F. J. Young succeeds Mr. Ruden.

Allan Cameron, general traffic agent of the Canadian Pacific at New York, has been transferred to the department of natural resources, and his former position has been abolished. Communications on passenger traffic should in future be addressed to W. H. Snell, eastern passenger agent, and on freight traffic to W. F. Stevenson, eastern freight agent at New York.

C. C. Lewis, commercial agent of the St. Louis & San Francisco lines at Houston, Tex., has been appointed also commercial agent of the St. Louis, Brownsville & Mexico, with office at Houston. H. J. Neff has been appointed commercial agent, with office at Corpus Christi, Tex., succeeding F. P. Dixon, resigned, and J. W. Jacobs has been appointed traveling freight agent, with headquarters at Corpus Christi, reporting to Mr. Neff.

John Corbett, general foreign freight agent of the Canadian Pacific, at Montreal, Que., has resigned to go into other business, and his former position has been abolished. Communications on import traffic should in future be addressed to W. T. Marlow, import freight agent at Montreal, and on export traffic to F. G. Frieser, export freight agent at Montreal, and in connection with accounts to George Wood, foreign freight accounting agent.

W. M. Rhett, general foreign agent of the Illinois Central at Chicago, has been appointed assistant to the freight traffic manager of that road, and the Yazoo & Mississippi Valley with office at Chicago, his jurisdiction over export and important matters to remain unchanged. C. A. Florence, assistant general foreign agent of the Illinois Central at Chicago, has been appointed export and import agent, with office at Chicago, and both their former positions have been abolished.

J. B. Stewart, whose appointment as general freight and passenger agent of the New York, Ontario & Western, has been announced in these columns, was born on November 23, 1871, at New York City, and was educated in the public schools of his native city. Mr. Stewart began railway work on April 22, 1885, with the Erie Railroad, and in September, 1893, he went to the New York, Ontario & Western as a bill of lading clerk. He was afterwards made assistant ticket agent, and in May, 1900, became agent. In September, 1908, he was appointed general eastern agent, which position he held at the time of his recent appointment as general freight and passenger agent.

W. G. Womble, general freight agent of the Raleigh & Southport has been appointed division freight agent of the Raleigh & Southport division of the Raleigh, Charlotte & Southern, with office at Raleigh, N. C. Henry A. Page, president and general freight and passenger agent of the Aberdeen & Asheboro, the Durham & Charlotte, and the Sanford & Troy, has been apopinted general agent of the Durham & Charlotte division, and the Aberdeen & Asheboro division of the Raleigh, Charlotte & Southern, with office at Aberdeen, N. C., and John A. Mills, president and general manager of the Raleigh & Southport, has been appointed general agent of the Raleigh & Southport division of the Raleigh, Charlotte & Southern, with office at Raleigh, N. C. (See an item under Operating Officers.)

H. T. Jenney has been appointed commercial agent of the Lehigh Valley, with office at Toledo, Ohio. M. J. Todd has

been appointed commercial agent, with office at Cincinnati; M. Wolf has been appointed commercial agent, with office at Indianapolis, Ind., and E. L. Abbett commercial agent at Columbus, Ohio, has been transferred and his former position has been abolished. J. L. Kellogg, agent at Milwaukee, Wis., has been appointed commercial agent, with office at Milwaukee, and will also represent the following fast freight lines operating over the Lehigh Valley: Traders Despatch, Lehigh & Wabash Despatch, Lake Shore-Lehigh Valley Route, Michigan Central Lehigh Valley Route, Pere Marquette-Lehigh Valley Line and Reading Despatch.

E. C. Morgan, district freight agent of the Southern Railway at Chattanooga, Tenn., has been appointed commercial agent, and W. A. McCarthy, traveling freight agent of the Eastern & Southern Despatch at Rochester, N. Y., has been appointed traveling freight agent of the Southern Railway, both with offices at Buffalo, N. Y. J. N. Templeton, commercial agent at Pittsburgh, Pa., has been appointed commercial agent, with office at Birmingham, Ala., succeeding J. L. Edwards, resigned to go into other business. J. A. Werne, freight soliciting agent at Louisville, Ky., succeeds Mr. Templeton. G. A. Perry, traveling freight agent at Indianapolis, Ind., succeeds Mr. Werne, and G. H. Rudolph succeeds Mr. Perry. K. M. Pinaire has been appointed traveling freight agent, with office at Pittsburgh, Pa.

J. L. Amos, commercial freight agent of the Missouri Pacific-Iron Mountain system at Philadelphia, Pa., has been appointed general agent, with office at St. Louis, Mo., succeeding Charles Rippin, resigned to become traffic commissioner of the St. Louis Merchants Exchange, effective March 1. J. O. Barkley, commercial freight agent at St. Joseph, Mo., has been appointed general agent in charge of freight and passenger traffic, with headquarters at St. Joseph, and E. S. Blair has been appointed general agent, with office at Los Angeles, Cal., succeeding J. M. Norton, resigned to engage in other business. A. S. Edmonds, commercial freight agent at Birmingham, Ala., has been transferred to Philadelphia, succeeding Mr. Amos, and Norton England, commercial agent at Greensboro, N. C., succeeds Mr. Edmonds.

Engineering and Rolling Stock Officers.

E. G. Hewson has been appointed resident engineer of the Grand Trunk, with office at Toronto, Ont., succeeding C. W. Power, resigned.

J. T. Luscombe, division master mechanic of the Toledo & Ohio Central and the Zanesville & Western at Bucyrus, Ohio, has been appointed master mechanic of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Bellefontaine, Ohio, effective March 1.

W. R. Coln has been appointed roadmaster of the Rock Island Lines, with jurisdiction over that part of sub-division 53 from Haskell, Ark., to Mile Post 97 and sub-division 53-A between Tinsman, Ark., and Crossett, succeeding S. J. Rufer, resigned.

H. E. Passmore, division master mechanic of the Toledo & Ohio Central at Kenton, Ohio, has been appointed division master mechanic of that road and the Zanesville & Western, with headquarters at Bucyrus, Ohio, succeeding J. T. Luscombe, resigned to accept service with another company, effective March 1.

P. C. Connelly, formerly trainmaster of the Dakota division of the Great Northern at Grand Forks, N. D., who was granted an indefinite leave of absence about four months ago, has been appointed roadmaster of the Spokane division, with office at Spokane, Wash., succeeding J. H. Conlan, transferred to the Cascade division.

H. A. Woods, assistant chief engineer of the Grand Trunk Pacific at Montreal, Que., has been transferred as assistant chief engineer to Winnipeg, Man., and will have charge of the construction of branch lines and the routine work of both the eastern and western sections. B. B. Kelliher, chief engineer at Winnipeg, will in future devote his time entirely to superintending the main line construction work through the Rocky mountains.

W. H. Erskine, assistant master mechanic of the Minneapolis & St. Louis at Minneapolis, Minn., has been appointed division master mechanic with jurisdiction over the Central and Western divisions, and headquarters at the Cedar Lake shops, Minneapolis. T. Windle, assistant master mechanic at Marshalltown, Ia., has been appointed general foreman of the Marshalltown shops, and his former position has been abolished. Henry Marsh, general car foreman at Marshalltown, has been appointed district car foreman of the Eastern division, with headquarters at Marshalltown, and his former position has been abolished.

Charles E. Gossett, whose appointment as general master mechanic of the Minneapolis & St, Louis, with office at Minneapolis, Minn., has been announced in these columns, was born January 25, 1869, at Millerstown, Ky. He received a common school education and began railway work in 1887 with the Kansas City, Fort Scott & Gulf, now a part of the St. Louis & San Francisco. He subsequently served a machinist apprenticeship in a contract shop and after completing that became a locomotive fireman. In 1892 he was made a locomotive engineer and served in that capacity on the Hannibal & St. Joseph, now a part of the Chicago, Burlington & Quincy; on the Wabash; the Chicago & Alton; the Atchison, Topeka & Santa Fe, and the old Rock Island & Peoria, now a part of the Chicago, Rock Island & Pacific. In 1899 he was made traveling engineer of the Rock Island at Chickasha, Okla.; in March, 1905, he was promoted to master mechanic, with office at Eldon, Mo., and two years later was transferred to Kansas City. He later resigned to become master mechanic of the Iowa Central at Marshalltown, Iowa, and two years afterward was transferred to Minneapolis as master mechanic of the Minneapolis & St. Louis. On January 10, 1912, subsequent to the absorption of the Iowa Central by the Minneapolis & St. Louis, he was made general master mechanic of the entire line.

OBITUARY.

A. S. Crawford, division passenger agent of the Chicago, Burlington & Quincy, with office at Galesburg, Ill., died at that place on February 18.

W. R. Miller, traveling freight agent of the Kanawha Despatch, with office at Kansas City, Mo., died in his room in a hotel at St. Louis, Mo., on February 23.

Frank Stuart Bond, who was president of the Philadelphia & Reading from 1881 to 1882, died on February 26, at Jekyl Island, Ga. Mr. Bond was born at Sturbridge, Mass., on February 1, 1830, and began railway work in 1849 in the office of the treasurer of the Norwich & Worcester. From 1851 to 1856, he was secretary of the Cincinnati, Hamilton & Dayton, and during the following four years he was secretary and treasurer of the Auburn & Allentown and the Schuylkill & Susquehanna. From 1868 to 1873 he was vice-president of the Missouri, Kansas & Texas, and then for eight years was vice-president of the Texas & Pacific. From 1881 to 1882 he was president of the Philadelphia & Reading, and from 1884 to 1886 was president of the Cincinnati, New Orleans & Texas Pacific, the Alabama Great Southern, the New Orleans & Northeastern, the Vicksburg & Meridian, and the Vicksburg, Shreveport & Pacific. In 1886 he became vice-president of the Chicago, Milwaukee & St. Paul, from which position he retired on January 1, 1900. Mr. Bond was a member of the Metropolitan, the Union League, and the Century clubs of New York, and the Jekyl Island club. He belonged also to the Loyal Legion, the Sons of the American Revolution, the Metropolitan Museum of Art, the American Museum of Natural History and the National Academy of Design.

FOREIGN RAILWAY NOTES.

The gross earnings of the Swiss State Railways in 1911 were 4½ per cent. greater than in 1910, their working expenses 6½ per cent. greater; which left an increase of less than 1 per cent. in net earnings.

In 1892 a commission was appointed to award contracts for rails, rail fastenings and rolling stock required by the Russian railways to the various works in Russia, according to their capacity, the principle being that the price should be what the foreign works would supply them for, plus the duty, and the purpose being to establish industries in Russia. This policy was to expire in 20 years, and the Russian works are anxious to know if it will be continued. The authorities are suspected of imagining that the industries have been encouraged enough and that they would do better if they had more competition.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Missouri, Oklahoma & Gulf has ordered 4 consolidation locomotives from the Baldwin Locomotive Works.

The Chicago, Milwaukee & St. Paul has ordered 10 Mallet locomotives and 30 Pacific type locomotives from the American Locomotive Company.

The Delaware, Lackawanna & Western, which was in the market for 40 locomotives, as mentioned in the *Railway Age Gazette* of January 26, is now figuring on 28 locomotives instead. This inquiry comprises 15 mikado locomotives, seven Pacific type locomotives and six six-wheel switching locomotives.

The New York Central Lines have ordered 30 Pacific type locomotives, 30 six-wheel switching locomotives and 25 consolidation locomotives from the American Locomotive Company. All these locomotives will be equipped with superheaters. This order will be distributed as follows: New York Central & Hudson River, 20 Pacific type locomotives having 26 in. x 26 in. cylinders, 69 in. driving wheels, and in working order weighing 266,000 lbs., designated as class K-11, duplicates of former locomotives ordered; Cleveland, Cincinnati, Chicago & St. Louis, 10 Pacific type locomotives having 22 in. x 26 in. cylinders, 75 in. driving wheels, and in working order weighing 237,000 lbs., designated as class K K, and 10 six-wheel switching locomotives having 21 in. x 28 in. cylinders, 57 in. driving wheels, and in working order weighing 166,000 lbs., designated as class B-10-T; Peoria & Eastern, 10 consolidation locomotives having 26 in. x 30 in. cylinders, 57 in. driving wheels, and in working order weighing 244,000 lbs., designated as class G-46-H; Toledo & Ohio Central, 10 consolidation locomotives having 26 in. x 30 in. cylinders, 57 in. driving wheels, and in working order weighing 241,000 lbs., designated as class G-46-E; Lake Erie & Western, 5 consolidation locomotives having 25 in. x 32 in. cylinders, 63 in. driving wheels, and in working order weighing 241,000 lbs., designated as class G-16-W; Michigan Central, 20 six-wheel switching locomotives having 21 in. x 28 in. cylinders, 57 in. driving wheels, and in working order weighing 166,000 lbs., designated as class B-10-W.

CAR BUILDING.

The New York, New Haven & Hartford has ordered 20 mail cars from the Laconia Car Company.

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for 4 second hand, flat bottom gondola cars, preferably steel.

The Chicago, Milwaukee & St. Paul, mentioned in the *Railway Age Gazette* of February 9 as building 1,500 cars at the company's shops, has now increased this order to 2,000.

The Spokane, Portland & Seattle has ordered the 17 coaches, 4 observation cars and 1 dining car mentioned in the *Railway Age Gazette* of January 19, from the Barney & Smith Car Company.

The Bessemer & Lake Erie has ordered 1,000 fifty-ton all-steel gondola cars from the Pressed Steel Car Company, and 500 fifty-ton all-steel gondola cars, 500 fifty-ton steel underframe box cars, and 100 fifty-ton all-steel box cars from the Standard Steel Car Company.

The Pennsylvania Lines West, mentioned in the *Railway Age Gazette* of February 23 as having ordered 54 passenger cars, has divided this order as follows: Standard Steel Car Company, 35; American Car & Foundry Company, 8; Barney & Smith Car Company, 5; Pressed Steel Car Company, 4; Pullman Company, 2.

IRON AND STEEL.

The Norfolk & Western has ordered 12,000 tons of rails from the Carnegie Steel Company.

The Rock Island Lines expect to place orders in the near future for 25,000 tons of rails.

Supply Trade News.

E. M. Richardson has been elected a director of the Chicago Pneumatic Tool Company, to succeed Oliver Wrenn.

The fifth annual cement show of the Cement Products Exhibition Company was held at Chicago on February 21-28 inclusive.

See an item under Court News in regard to the General Electric Company, Schenectady, N. Y., and its subsidiary, the National Lamp Company.

The Independent Pneumatic Tool Company, Chicago, has secured larger floor space in the Farmers' Bank building, Chicago. The old office was at 1426, and the new office is located at Nos. 1208 and 1209.

Taylor & Arnold, Montreal, Que., have been made sole representatives in Canada for the American electric headlight equipment for locomotives, a product made by the Remy Electric Company, Anderson, Ind.

A. L. Whipple, whose retirement from the Whipple Supply Company, New York, was noted in the *Railway Age Gazette* of February 9, has entered the sales department of the Ward Equipment Company, New York. Mr. Whipple has been in the railway supply business for many years.

Samuel T. Fulton, western manager of the Railway Steel-Spring Company, New York, with office at Chicago, has been appointed general sales agent of the company, with office at New York, effective March 1. The greater part of Mr. Fulton's career has been in the railway service, and he enjoys a wide acquaintance among both railway and supply men. He was born January 11, 1866, at Topeka, Kan., and after being educated in the public schools entered the railway service July 1, 1879, as messenger in the telegraph office of the Kansas Pacific at Topeka. He was telegraph operator and agent at various stations on the Kansas Pacific and Union Pacific, and for two years was telegraph operator for the Western Union Telegraph Company at Topeka. In 1885 he became secretary to the superintendent of machinery of the Atchison, Topeka & Santa Fe; in 1888 secretary to the general superintendent at Chicago; in 1889 train despatcher of the Chesapeake & Ohio, and in 1890 he was made secretary to the freight traffic manager of the Cleveland, Cincinnati, Chicago & St. Louis. In 1891 he became stenographer to the chairman of the Central Traffic Association at Chicago; in 1892 secretary to the freight traffic manager of the Kansas City, Ft. Scott & Memphis; in 1893 chief clerk to the general superintendent; in 1895 chief clerk to the president and general manager, and in 1899 assistant to the president of that road. In August, 1901, he became chief clerk to the vice-president and general manager of the St. Louis & San Francisco at St. Louis, and from January, 1902, to February, 1903, was general manager of the Crowe Coal & Mining Company of Kansas City. In 1903 he returned to railway service as assistant to the vice-president of the St. Louis & San Francisco, and in April, 1904, was appointed assistant to the president of the Chicago, Rock Island & Pacific at Chicago, which position he held until December 1, 1909. After the segregation of the Rock Island and Frisco he entered the railway supply business as western manager of the Railway Steel-Spring Company.

S. T. Fulton.

Joseph M. Brown, Great Northern building, Chicago, has been appointed general western sales agent for the motor-driven baggage, warehouse and freight trucks built by the Elwell-Parker Electric Company of Cleveland, Ohio.

John B. Given, heretofore sales manager of C. H. Whall & Company, Boston, Mass., has opened an office at 253 Broadway, New York, to handle railway specialties on his own account. Mr. Given is still connected with the Whall company in another capacity.

The Hildreth-Jones Company, Monadnock block, Chicago, announces that that company title has been discontinued and the title of Morgan T. Jones & Company substituted. Hildreth & Company, of New York, Philadelphia and Pittsburgh, will be associated with it.

The Lea Equipment Company, New York, maker of centrifugal pumping equipment and the Lea-Simplex cold saws, has moved its general offices to the corner of Stenton and Wyoming avenues, Philadelphia, Pa., where its plant is located. The present quarters in New York will be retained for the export department, in charge of Albert C. Lea, president. The general sales offices will be in charge of H. R. Williams, general sales manager.

L. H. Mesker, in the Cleveland, Ohio, office of Manning, Maxwell & Moore, Inc., New York, has been made manager of the St. Louis, Mo., office of that company, succeeding C. L. Lyle, resigned. Frank P. Smith, formerly in the sales department of Manning, Maxwell & Moore, has again entered that department of that company, with office in New York. C. R. McCullough, of the Packard Motor Car Company, Detroit, Mich., has resigned to enter the sales department of Manning, Maxwell & Moore with office in Detroit.

The Vulcan Engineering Sales Company has been organized and incorporated, with offices in the Fisher building, Chicago, and at 30 Church street, New York. The company controls the entire product and will handle all sales of the Hanna Engineering Works, Chicago; Mumford Molding Machine Company, Plainfield, N. J.; and the Quincy-Manchester-Sargent Company of New York. Arrangements for additional factory facilities are under way, and the company will itself make a number of special railway tools and devices for shop and maintenance work. The officers are: President, H. K. Gilbert, formerly vice-president of the Buda Company, Chicago; secretary-treasurer, P. W. Gates, now president of the Hanna Engineering Works and formerly president of the Gates Iron Works. E. H. Mumford, now vice-president and general manager of the Mumford Molding Machine Company, will continue in the same position and with the same duties as heretofore, and William L. Laib, vice-president and secretary of the Hanna Engineering Works, will continue in his present position and present duties with that company.

Permanent Exhibit of Railway Appliances.

Rapid progress is being made in the installation of exhibits at the Permanent Manufacturers' Exhibit of Railway Supplies and Equipment in the Karpen building, Chicago, which is to have its official opening during the week of March 16-23. Thus far the exhibits of the following companies have been installed, or are being installed in the spaces reserved:

Crane Company, Dearborn Drug & Chemical Company, U. S. Metallic Packing Company, Railway Utility Company, Barco Brass Company, Pyle-National Electric Headlight Company, Railway Department, International Correspondence Schools, American Carpet & Rug Company, Gold Car Heating & Lighting Company, Detroit Hoist & Machine Company, Chicago Car Heating Company, the O. M. Edwards Company, the Verona Tool Company, the Forest City Paint & Varnish Company, and the *Railway Age Gazette*.

It has been decided to devote the entire second floor of the building to a permanent exhibit of maintenance of way appliances. The Car Foremen's Association of Chicago and the Car Clerks' Association have decided to make use of the assembly room and facilities afforded in connection with the exhibit for their regular meetings. The Western Railway Club will hold its March meeting there on March 19, and several other associations are considering making use of the facilities in a similar manner.

Railway Appliances Association.

A list of the exhibitors who have secured space for the fourth annual exhibition of the Railway Appliances Association, at the Coliseum and First Regiment Armory, Chicago, in connection with the convention of the American Railway Engineering Association, was published in the *Railway Age Gazette* of January 12, page 65. The following have since been added to the list of exhibitors:

Allith-Prouty Company, Danville, Ill.
American Rail Joint Co., Toronto, Ont.
American Nut & Bolt Fastener Co., Pittsburgh, Pa.
Atlas Preservative Company of America, New York.
L. S. Brach Supply Co., New York.
Cambria Steel Co., Pittsburgh, Pa.
Chicago Steel Railway Tie Co., Chicago.
Detroit Switch Lock Co., Detroit, Mich.
Duluth Corrugating & Roofing Co., Duluth, Minn.
Edison Storage Battery Co., Orange, N. J.
Enright-Frey Railway Equipment Co., New Orleans, La.
Fairmont Machine Co., Fairmont, Minn.
Hoeschen Manufacturing Co., Omaha, Neb.
C. W. Hunt Co., New York.
International Harvester Co., Chicago.
Jerome Metallic Packing Co., Chicago.
Kellogg Switchboard & Supply Co., Chicago.
Kennicott Co., Chicago.
Keuffel & Esser Co., Chicago.
The Lehon Co., Chicago.
Luitwieler Pumping Engine Co., Rochester, N. Y.
Walter Macleod & Co., Cincinnati, Ohio.
McGraw Publishing Co., New York.
McKinnis Switch Lock Co., Chicago.
North Western Construction Co., New York.
Ogle Construction Co., Chicago.
Payson Manufacturing Co., Chicago.
Rabok Manufacturing Co., St. Louis, Mo.
Rich Tool Co., Chicago.
Signal Accessories Co., Chicago.
Tweedy, Hood & Finlen Co., Chicago.
United States Electric Co., Chicago.
United States Light & Heating Co., New York.
Western Electric Co., Chicago.
G. H. Williams Co., Cleveland, Ohio.
Winters-Coleman Scale Co., Springfield, Ohio.
J. D. Young Railroad Rail Joint Co., Oklahoma City, Okla.

TRADE PUBLICATIONS.

HAMMER DRILLS.—The Ingersoll-Rand Company, New York, has published form No. 4111 on type BC hammer drills, describing their construction in detail, and pointing out their advantages. Illustrations and diagrams are given.

NORTHERN PACIFIC.—The passenger department of this company has published a small folder entitled Colonist Fares to the Fertile Northwest. These fares will be effective from March 1 to April 15. Additional information is given on the equipment of the trains, their schedules and also some interesting facts on some of the northwestern states. A large map is included.

DRILLS.—The Morse Twist Drill Company, New Bedford, Mass., has published a 350-page catalog, illustrating and giving the prices and dimensions of its angle twist drills, reamers, chucks, milling cutters, taps, machinists' tools, etc. A separate pamphlet published by this company illustrates and describes a new indexed case for drills from which the proper size drill can be quickly selected.

SOUTHERN RAILWAY.—The Land and Industrial Department of this company has published an interesting booklet entitled Stock Raising in the Southeast, telling of the advantages of this region for the raising of cattle, horses, hogs, sheep, poultry, etc., and showing how cheaply and easily these animals are fed. Some figures are given showing the success with which many of the farmers have met. Facts on the water and climate, transportation and the market are included.

EQUIPMENT INSULATION.—The Union Fibre Company, Winona, Minn., has published a 110-page booklet telling of the evolution of the refrigerator car in the United States, tests of the heat and cold-resisting properties of refrigerator cars and some data on insulation of refrigerator cars, steel passenger cars, etc. A description is also included of a refrigerator car built by the Union company to show its ideas of insulation, air circulation, ventilation and drainage for such equipment.

Railway Construction.

New Incorporations, Surveys, Etc.

Birmingham & Southeastern.—An officer writes that contracts are to be let at once to build an extension of about 20 miles in Alabama. The company now operates a line from Union, Ala., to Fort Davis, 7½ miles. J. M. Garrett, chief engineer, Union Springs, Ala.

Chicago, St. Paul, Minneapolis & Omaha.—An officer writes that contracts will be let this spring for laying second track from Hudson, Wis., east to Eau Claire, 68 miles. C. W. Johnson, chief engineer, St. Paul, Minn.

Clinton & Oklahoma Western.—Sub-contracts have been let for the work on this line, it is said, from Butler, Okla., west up the Washita Valley to a point in Roger Mills county to the following contractors: Acklin Brothers, F. L. Adams, M. Cunyon, E. L. Hale, B. Sweeney and P. Gleason. Guy V. McClure, chief engineer, Clinton, Okla. (February 16, p. 320.)

Crosbyton-South Plains.—Plans have been made to build an extension of about 35 miles from Crosbyton, Tex., southeast to Spur. It is expected that the work will be finished this year. The line is now in operation from Lubbock east to Crosbyton, about 38 miles. P. L. Connley, president, Chicago. (Apr. 28, p. 1016.)

Edmonton, Dunvegan & British Columbia.—The Board of Railway Commissioners of Canada has approved the location plans for the route through townships 53 to 56, ranges 24 to 26, west of the fourth meridian and authorized the crossing of highways between mile 0 and mile 30. The line is being built under an agreement with the Grand Trunk Pacific. The province of Alberta guarantees the company's bonds to the extent of $20,000 a mile for 350 miles. It is expected that about 100 miles will be built during 1912. J. D. McArthur, Winnipeg, Man., is interested.

Enid, Ochiltree & Western.—Work is now under way on an extension from the present terminus at Ochiltree, Tex., to the Texas-Oklahoma state line, about 40 miles. The line will eventually be extended to Enid, Okla., about 130 miles. W. T. Taylor, chief engineer, Dalhart, Tex. (Mar. 11, 1910, p. 546.)

Erie.—See an item regarding double-tracking work on this road, under Railway Financial News.

Gainesville & Northwestern.—An officer writes that a contract has been given to Burk & Joseph, Gainesville, Ga., to build from Gainesville, via Cleveland, to Robertstown, White county. The principal revenue will be derived from carrying timber. R. M. McCombs, president, St. Louis.

Grand Trunk Pacific.—Application will be made to the Saskatchewan legislature for the incorporation of the Grand Trunk Pacific Saskatchewan Railway to construct lines in Saskatchewan as follows: From a point at or near Watrous, southwesterly via Swift Current, to a point on the international boundary, between ranges 22 and 30, west of the third meridian; from a point at or near Saskatoon westerly and northwesterly to a point at or near Battleford; from a point near Melville west to a point near Regina; from a point near Saskatoon, southeasterly, to a point near Regina; from a point in township 36, range 8, west of the third meridian, southwesterly and westerly to a junction with the G. T. P. Biggar-Calgary line. B. B. Kelliher, chief engineer, Winnipeg, Man.

See Edmonton, Dunvegan & British Columbia.

Grand Trunk Pacific Saskatchewan.—See Grand Trunk Pacific.

Gulf, Texas & Western.—This company recently let contracts for building an extension from Jacksboro, Tex., southeast to Oran, about 25 miles. J. J. Jermyn, president, Scranton, Pa. (Feb. 23, p. 360.)

Houston & Texas Central.—Work is now under way building a cut-off between Giddings, Tex., and Stone City, about 40 miles. I. A. Cottingham, engineer maintenance of way and structures, Houston, Tex. (Feb. 9, p. 263.)

Illinois Central.—An officer writes that work is to be started at once on an extension from the present terminus of the Bloomington Southern branch to reach the Oolitic stone deposits, about seven miles. The grading contract has been given to John Scott & Sons, St. Louis, Mo., and the company's forces will carry out the rest of the work. It is expected to have the line completed in September of this year. A. S. Baldwin, chief engineer, Chicago, Ill.

Jonesboro, Lake City & Eastern.—An officer writes that surveys have been made and contracts are to be let soon for work on the extension between Wilson, Ark., and Memphis, Tenn. R. E. L. Wilson, president, Memphis, Tenn.

Kansas City, Mexico & Orient.—Work has been finished on the extension west from San Angelo, Tex., to Grenada, 132 miles. There remains a section of 32 miles to complete the line from Grenada to Fort Stockton. W. W. Colpitts, chief engineer, Kansas City, Mo.

Louisville & Nashville.—According to press reports, this company recently let 15 contracts for new lines and double-tracking work, aggregating about 150 miles, in Alabama and Tennessee, as well as the construction of three tunnels, to have a total length of 4,800 ft., near Blount Springs, Ala. Additional contracts are to be let in the near future for double-tracking work from Birmingham, Ala., south to Mobile, and to Pensacola, Fla. W. H. Courtenay, chief engineer, Louisville, Ky.

Medicine Hat (Electric).—Organized in Canada to build an electric line to connect Medicine Hat, Alta., with Dunmore and Elkwater lake. A. F. Krappel, D. W. Brown and W. Overplank are interested.

Minnesota, Dakota & Western.—According to press reports, a contract has been let for building 25 miles in Koochiching county, Minn. The company now operates 27½ miles of railway in Minnesota, and is planning to build about 150 miles of extensions. E. W. Backus, president, Minneapolis.

Missouri, Kansas & Texas.—It is understood that this company will build from Austin, Tex., south to San Marcos, 40 miles, during this year, if the present trackage rights over the International & Great Northern between those two places is not renewed. Such a line would necessitate the construction of a bridge over the Colorado river at or near Austin. S. B. Fisher, chief engineer, St. Louis, Mo.

Mountain Quarries Company's Line.—According to press reports, this company has finished work on the line from Auburn, Cal., east to the quarries near Cool, about eight miles. Morris Kind, president, San Francisco, Cal.

New York Subways.—The New York Public Service Commission, First district, is re-advertising for bids, to be received March 22, for the construction of section No. 2-A of the Lexington avenue subway. This section includes the work from the Canal street station on the Broadway line and the underlying portion of the Canal street crosstown subway. The section extends from the north side of Walker street under Broadway, 530 ft., to Howard street. The plans call for a four-track subway under Broadway, and two tracks for the underlying portion of the Canal street route.

Nipissing Central (Electric).—Bids are to be asked for soon, it is said, to build an extension from Haileybury, Ont., north along the shore of Temiscaminque lake to New Liskeard, five miles. P. L. Utley, chief engineer, Escanaba, Mich.

Nova Scotia Railway.—According to press reports, a contract has been given to M. P. & J. T. Davis, Quebec, Que., to build from Dartmouth, on the opposite side of the harbor from Halifax, east to Doan's Settlement, about 70 miles. The line is eventually to be extended to Country Harbor and the strait of Canso. A sub-contract is said to have been given to Cavicchi & Paganno, Halifax. L. K. Jones, Ottawa, Ont., secretary of the Department of Railways and Canals.

Oregon Eastern.—See Oregon Short Line.

Oregon Short Line.—A sub-contract has been given to Baube Brothers & Company, Salt Lake City, Utah, it is said, for grading work on the Oregon Eastern from Vale, Ore., southwest. The Utah Construction Company has the contract from Vale southwest through the Malheur river canyon to a point near the north shore of Malheur and Harney lakes in Harney

county. Carl Stradley, assistant general manager, Salt Lake City. (January 19, p. 132.)

PECOS VALLEY SOUTHERN.—This company, which operates a line from Pecos, Tex., to San Salmon Springs, is planning to build an extension northeast from Pecos to Lamesa, about 140 miles. It is understood that an extension will also be built south to Alpine, about 50 miles, to a connection with the Southern Pacific. L. M. Schwab, assistant engineer, Pecos, Tex. (Feb. 16, p. 321.)

PRINCE EDWARD & HASTINGS.—Incorporation has been asked for in Canada to build the following lines: From Trenton, Ont., to Gardenville, thence easterly through or near Albury, Rednersville and Rossmore, thence northwesterly to Frankfort and back to Trenton; from a point between Albury and Rednersville to Wellington, thence easterly through or near Bloomfield to Picton; from a point near Picton northerly to Demorestville, thence easterly through Northport and Solmesville to Ferry Point; from Bloomfield southwesterly to West Point; from Picton southwesterly to West Point; from Picton southwesterly to Black River, and from Picton easterly through Waupoos to Indian Point. Pringle & Guthrie, Ottawa, are the solicitors.

QUANAH, ACME & PACIFIC.—Work is now under way from the present terminus at Paducah, Tex., west to Floydada, about 60 miles. It is understood that the line will eventually be extended to El Paso, about 450 miles. A. F. Sommer, resident engineer, Quanah, Tex.

QUEBEC & SAGUENAY.—Application has been made to the Quebec provincial legislature for an act to continue in force all the rights of its act of incorporation, to build through the counties of Montmorency, Charlevoix, Saguenay and Chicoutimi, from a point on the Quebec Railway, Light & Power Company at St. Joachim, northeast following the St. Lawrence shore through Baie St. Paul to Ste. Irenee and Malbaie, thence via a point on the Saguenay river, between its mouth and Lake St. John, to a point at or near the boundary of the province of Quebec, through the county of Saguenay, also to build branch lines. An extension of time has been asked for the completion of the line from St. Joachim to Murray Bay of three years, and the completion of the other lines within seven years. Sir Rodolphe Forget, of the Quebec Railway, Light & Power Company, is president of the Quebec & Saguenay.

TEMISKAMING & NORTHERN ONTARIO.—An officer writes that bids are being asked for grading an extension from Earlton, Ont., to Elk Lake on the Montreal river. This extension is to be built at once. The maximum grades will be one per cent., and the maximum curvature six deg. There will be two steel briges, one over the Jean Baptist river and the other over the Montreal river. The roal will traverse an undeveloped agricultural district to the Elk Lake silver mining camp. S. B. Clement, chief engineer and superintendent maintenance, North Bay, Ont.

TEXAS CENTRAL.—Announcement has been made that an extension is to be built from the western terminus at Rotan, Tex., during this year. The present plans only call for building about 50 miles. This extension is ultimately to be built west to Roswell, N. M., about 275 miles. The branch, which runs from DeLeon to Cross Plains, about 40 miles, it is said, is also to be extended about 50 miles. R. H. Baker, president, Austin, Tex.

YADKIN RIVER.—Incorporated in North Carolina with $25,000 capital, to build from Boone, N. C., east to North Wilkesboro, about 45 miles. C. H. Cowles, Wilkesboro, N. C., G. M. Grandin, Tidioute, Pa., H. C. London, Lenoir, N. C., and T. B. Finley, North Wilkesboro, are the directors.

RAILWAY STRUCTURES.

APPLEBY, ONT.—See Toronto, Ont.

BAY CITY, MICH.—The Grand Trunk is building a bridge at Bay City, Mich. The plans call for two draw spans of 250 ft. each, and five fixed spans of 150 ft. each, with concrete piers. Contracts have just been let for extending the Grand Trunk tracks from the west to the east side of the river at Bay City.

BURLINGTON, ONT.—See Toronto, Ont.

CHICAGO, ILL.—The Indiana Harbor Belt has acquired from the Guaranty Trust Company of New York 13½ acres at the southwest corner of Forty-eighth and Morgan streets and the southwest corner of Forty-eighth and Aberdeen streets, to be used as a storage yard.

COOKSVILLE, ONT.—See Toronto, Ont.

EARLTON, ONT.—See Temiskaming & Northern Ontario under Railway Construction.

HAMILTON, ONT.—The Grand Trunk, it is said, is seeking to secure waterfront property on Burlington bay at Hamilton, as a site on which it will put up a grain elevator.

INGERSOLL, ONT.—According to press reports, the Canadian Pacific is planning to carry out improvements at Ingersoll, including the construction of a bridge to cost $30,000.

ISLINGTON, ONT.—See Toronto, Ont.

LAMBERT POINT, VA.—An officer of the Norfolk & Western writes that plans for the proposed improvements at Lambert Point are not yet finished. The work will include an extension to the yard tracks of about 96,000 ft., or over 18 miles. New shops, car sheds, etc., and a 21-stall roundhouse. (February 23, p. 361.)

LORNE PARK, ONT.—See Toronto, Ont.

MONTCLAIR, N. J.—An officer of the Delaware, Lackawanna & Western writes that bids have been received, and contracts will probably be let at once to put up a new passenger station at Montclair, N. J.

MONTREAL, QUE.—The Grand Trunk is building a bridge over the Lachine canal at Wellington street, Montreal, Que. It is to be the same type as the present structure, but will be much stronger.

NEW MARTINSVILLE, W. VA.—An officer of the Baltimore & Ohio writes regarding the improvements to be made to bridges and trestles on the Ohio River division, that authority has been asked for some bridge work between Brooklyn Junction and Wheeling, but up to the present time the only work authorized has been on bridge 378 at New Martinsville, W. Va.

NEWARK, OHIO.—The work of remodeling the Baltimore & Ohio passenger station in Newark will be started within a week or two. The materials are now being assembled and the improvement will be made by the railway forces at a cost of $15,000. The general waiting room on the first floor will be 28 ft. x 73 ft., and the general offices on the second floor will be remodeled. Four entrances will lead from the general waiting room to platforms.

NEW YORK, N. Y.—See item in General News regarding the improvements at Grand Central Terminal, New York.

OAKVILLE, ONT.—See Toronto, Ont.

PORTLAND, ME.—The Grand Trunk is building a bridge over the entrance to the harbor at Portland, Me., to replace the present structure. The new bridge is to have a 225-ft. draw with concrete piers.

PORTLAND, ORE.—The Southern Pacific will begin work soon on the erection of a freight house of brick and concrete, 200 ft. x 50 ft.

ST. LOUIS, MO.—The Manufacturers' Railway expects to begin work in the spring on a ten-story freight depot and warehouse to cost approximately $750,000. The warehouse will be used by some of the trunk line railways jointly with the Manufacturers' Railway.

SPRINGFIELD, MO.—President B. L. Winchell, of the St. Louis & San Francisco, told the Young Men's Business Club at a banquet given him on February 22 that work will be started within the present year on a new passenger station. The site for the station has been bought.

TORONTO, ONT.—The Canadian Northern will build stations between Toronto, Ont., and Hamilton, it is said, at the following places: West Toronto, Islington, Cooksville, Lorne Park, Oakville, Appleby, Burlington and Watertown.

TUCSON, ARIZ.—The Southern Pacific plans to rebuild its machine shop at an estimated cost of $200,000.

WATERTOWN, ONT.—See Toronto, Ont.

WEST TORONTO, ONT.—See Toronto, Ont.

Railway Financial News.

Arkansas, Oklahoma & Western.—See Kansas City & Memphis Railway.

Atchison, Topeka & Santa Fe.—The $18,000,000 4½ per cent. 50-year bonds secured by a mortgage on the California, Arizona & Eastern, mentioned in our issue of February 16, page 322, are to be offered for sale by J. P. Morgan & Company, half of the issue being offered in the United States and the other half in London. The Kansas railway commission has given its permission for the sale.

Chicago & Eastern Illinois.—Kuhn, Loeb & Company, New York, have bought from the company and resold $2,680,000 Chicago & Eastern Illinois Railroad 5 per cent. purchase money first lien coal bonds.

Delaware, Lackawanna & Western.—Stockholders have voted to authorize the directors to increase the capital stock from $30,277,000 to $42,277,000, and to lease the Syracuse, Binghamton & New York. The S. B. & N. Y. has heretofore been operated independently but has been controlled by the D. L. & W.

Denver, Laramie & Northwestern.—The *Commercial & Financial Chronicle* says that a plan has been successfully formed to reduce the floating debt of the D. L. & W. by $1,000,000, and to so concentrate the holdings of the stock of the company that stability of management would be assured for ten years.

The *Wall Street Journal* recently published a report that it was expected to make arrangements for the sale of $6,000,000 30-year 5 per cent. bonds to pay for building the road into the coal fields of Wyoming.

Erie.—The directors have authorized $10,000,000 5 per cent. three-year notes to complete double tracking to Chicago. About $20,000,000 will be needed to complete the work but the balance of the cost will be supplied from earnings and cash on hand.

Illinois Southern.—This company, which has been going through a friendly reorganization since June 1, 1911, has published a general balance sheet as of December 1, 1911, which gives assets as follows: Rail and equipment, $7,973,378; material and fuel, $52,561; cash, $47,539; other working assets, $51,959; total assets, $8,125,437. Liabilities as follows: Common stock, $4,000,000; preferred 6 per cent. cumulative stock, $1,000,000; first mortgage bonds outstanding, $1,630,000; income mortgage bonds outstanding, $1,380,000; working liabilities, $97,928; taxes not due, $12,000; equipment replacement, $3,650; profit and loss, $1,858; total, $8,125,437.

Kansas City & Memphis Railway.—Stockholders of the Arkansas, Oklahoma & Western have voted to ratify the proposal of the directors to exchange their stock on a basis of one share of A. O. & W. stock for five-eighths of a share of K. C. & M. The K. C. & M. has furnished $30,000 to pay off floating debt and has assumed the outstanding $300,000 bonds of the A. O. & W.

Maine Central.—Lee, Higginson & Co. and F. S. Moseley & Co., both of Boston, bought from J. P. Morgan & Co., New York, and resold at par $12,000,000 one-year 4 per cent. coupon debenture notes of March 15, 1912-1913. These notes are legal investments for Massachusetts savings banks. In July a general mortgage bond issue of $25,000,000 was authorized, of which $12,000,000 bonds were to have been sold at once for refunding purposes, but the sale was not apparently found to be expedient and the present sale of notes is said by the *Boston News Bureau* to be a temporary means of refunding until the notes may be themselves taken up through the sale of mortgage bonds or of stock.

Pere Marquette.—Control of this company has been bought by Newman Erb, who was associated with Edwin Hawley in the merger of the Minneapolis & St. Louis and the Iowa Central. Newman Erb has been elected a director of the executive committee. Mr. Erb gave out the following in regard to the Pere Marquette:

Until 1911 the Pere Marquette had not prepared for the natural development and increase of its business and was endeavoring to meet about 25 per cent. traffic expansion without any corresponding increase of its facilities or adequate improvements for economical operation required by the gradual reduction of rates and increase of wages in recent years; but during the last calendar year the company expended upward of $2,000,000 in revision of grades, double tracking 47 miles of main line, adding 25 miles of siding and passing tracks, new roundhouses, enlargement of machine shops, many new steel bridges and other important improvements. It also bought sixty locomotives and added to its passenger equipment, involving a total for improvements and equipment of upward of $3,000,000.

This development work has only just been completed. The company has therefore not yet reaped its benefit. Besides, during the improvement work traffic was moved under difficulties involving expensive delays and added transportation cost. Indeed, at times and for considerable periods embargoes were placed on through business.

It may now be confidently expected that the "turn of the tide" with this property is at hand and that the results of operation from now on will approach the normal ratio of operating cost, with corresponding surplus in line with its neighboring roads.

Philadelphia & Reading.—At a meeting of the stockholders of the Reading & Columbia, a majority of the capital stock being owned by Reading Company, authority was given for the issue of $850,000 consolidated first mortgage 4 per cent. bonds, to be used to retire $650,000 first mortgage 5 per cent. bonds, maturing March 1, 1912, and $350,000 second mortgage bonds maturing on September 1, 1912; $150,000 of these second mortgage bonds, which are owned by the Reading Company, will be canceled, and in place thereof the Reading Company will take $150,000 debenture bonds, which will be subsequent in lien to the new consolidated mortgage bonds.

Sanford & Troy.—This company has been merged with the Raleigh & Southport, the Durham & Charlotte and the Aberdeen & Ashboro, which have been taken over by the Raleigh, Charlotte & Southern now controlled by the Norfolk Southern. (January 5, page 3.)

Syracuse, Binghamton & New York.—See Delaware, Lackawanna & Western.

FOREIGN RAILWAY NOTES.

The concession to build a railway from Piratininga, Brazil, through the valleys of the Peixe Feio river to the frontier of the state of Matto Grosso, with an extension of over 360 miles, has been granted. The concession is to run for 90 years.

The Pacific Railway, Argentina, has opened to traffic its branch line from Rawson to Arribenos, its present terminal point. The new stations on the line are Ingeniero Silveira, Coronel Isleno, Ines Indart, Los Indios, and Ascension. It is soon to be extended to Sampacho, a distance of 25 miles from Arribenos. The total length of the line is 82 miles. A telegraph line has been erected alongside the railway.

The construction of railways from Elmore, Victoria, to Cohuna, and from Swan Hill to Piangil, is recommended by the Railways Standing Committee. The chief engineer of railway construction, who has inspected the proposed routes, states that there is every indication that the lines will prove valuable in encouraging settlement. Surveys of the lines are now being carried out, and plans will be prepared for specific reference to the Railways Standing Committee.

The Russian minister of finance is considering a proposed Ryazan-Ural railway to connect the town of Uralsk with the station of Ilietzk and the Tashkent railway, and also a proposal to widen the narrow gage Erschoff-Uralsk line. The new line it is asserted will greatly facilitate traffic in Central Asian products. A Russian inter-departmental council has been called to consider the proposed construction of several important railways as follows: Orenburg-Orsk, Uralsk-Ilietzk, and Troitzk-Orsk. All these projects will be subjected to an accelerated consideration, as they are expected, if they materialize, to be of great advantage to the local population in furnishing work where the harvest has failed.